PILLAR JIB CRANE

I.D. Nº 101 COLOR OF BAR : BLUE

LOAD CAPACITY PAINTED ON BAR 1/4 TONS. (500 LBS)

DATE CAP. & I.D. Nº PAINTED ON BAR _____

DATE OF LAST LOAD TEST. 1-10-89

TEST LOAD WEIGHT .3125 TONS (625 LBS)

TEST LOAD % 125%

STRESS CALCULATIONS:
DONE BY J. Woodard

DATE 1-10-89

REMARKS :

FERMILAB

MECHANICAL DEPARTMENT - MS#221
WILSON HALL 13TH FLOOR - EXT: 4568

JANUARY 11, 1989

TO: *DISTRIBUTION*
FROM: *JEFFREY L. WESTERN*
SUBJECT: SCINTILLATOR FABRICATION FACILITY - LIFTING FIXTURE

ON TUESDAY JANUARY 10,1989 BOB SCHERR AND MYSELF WITNESSED THE 125% LOAD TEST OF SPREADER BAR #101, WHICH IS LOCATED AT 26-28 NEUQUA. PHOTOS WERE TAKEN AND ARE ON FILE WITH THE CALCULATIONS.

SPREADER BAR #101

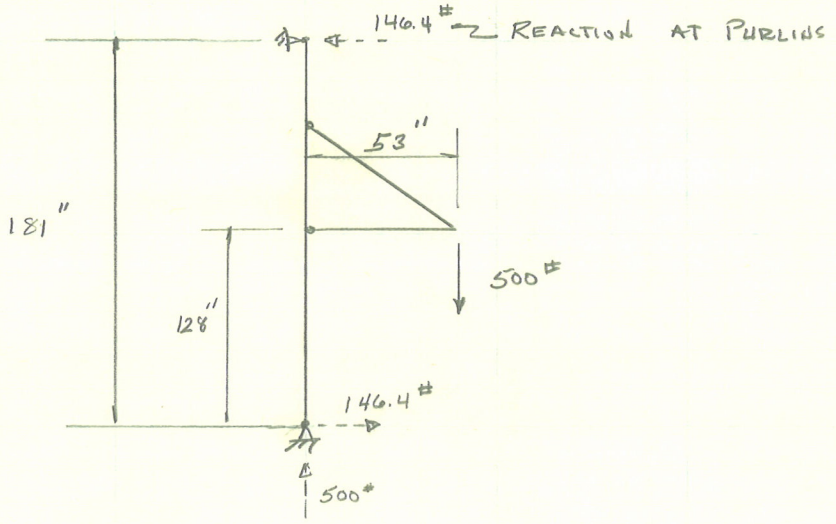
RATED LOAD .25 TONS (500 LBS)
TEST LOAD .3125 TONS (625 LBS)

WITNESS SIGNATURES

BOB SCHERR (SAFETY ENGINEER) R. E. Scherr

JEFF WESTERN (PROJECT ENGINEER)

DISTRIBUTION:
- JACK LINDBERG
- BOB SCHERR
- NORM BOSZEK
- SPREADER BAR CACULATION FILE



TS 4x4 x 1/4

$M_{MAX} = 146.4(128") = 18,740$ IN-LB $\qquad P = 500$

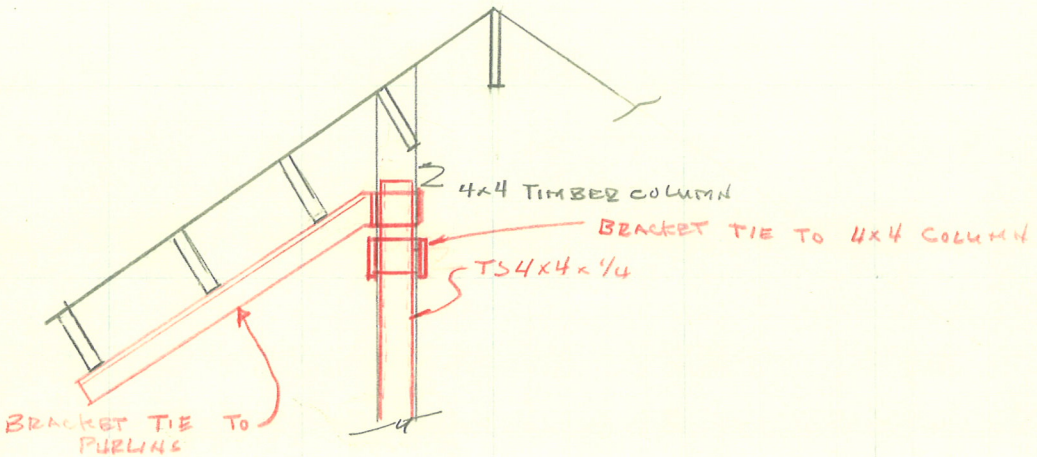
$F_{bx} = M_x/S = 18,740/4.11 = 4,560$ PSI

$F_a = P/A = 500/6.36 = 78.6$ PSI

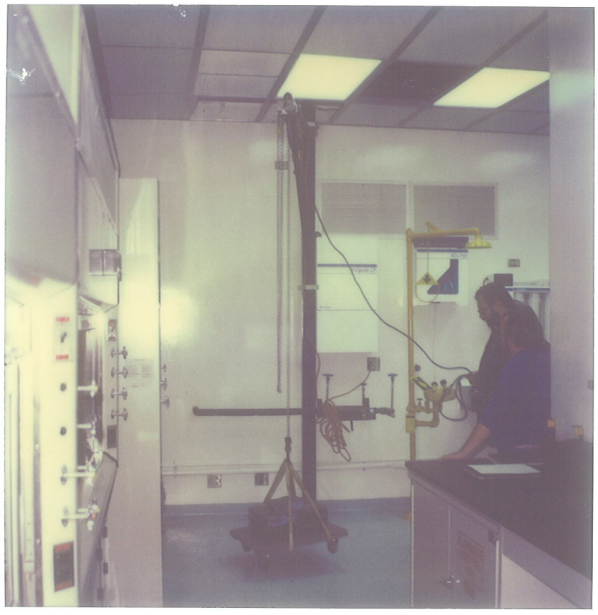
$78.6/21,600 + 4560/21,600 = .21 \leq 1.00$

$\therefore$ COL. ADEQUATE

PURLIN DETAIL



LOAD TEST
1-10-89



LOAD TEST
1-10-89

LOAD TEST 1.25 x 500 = 625#

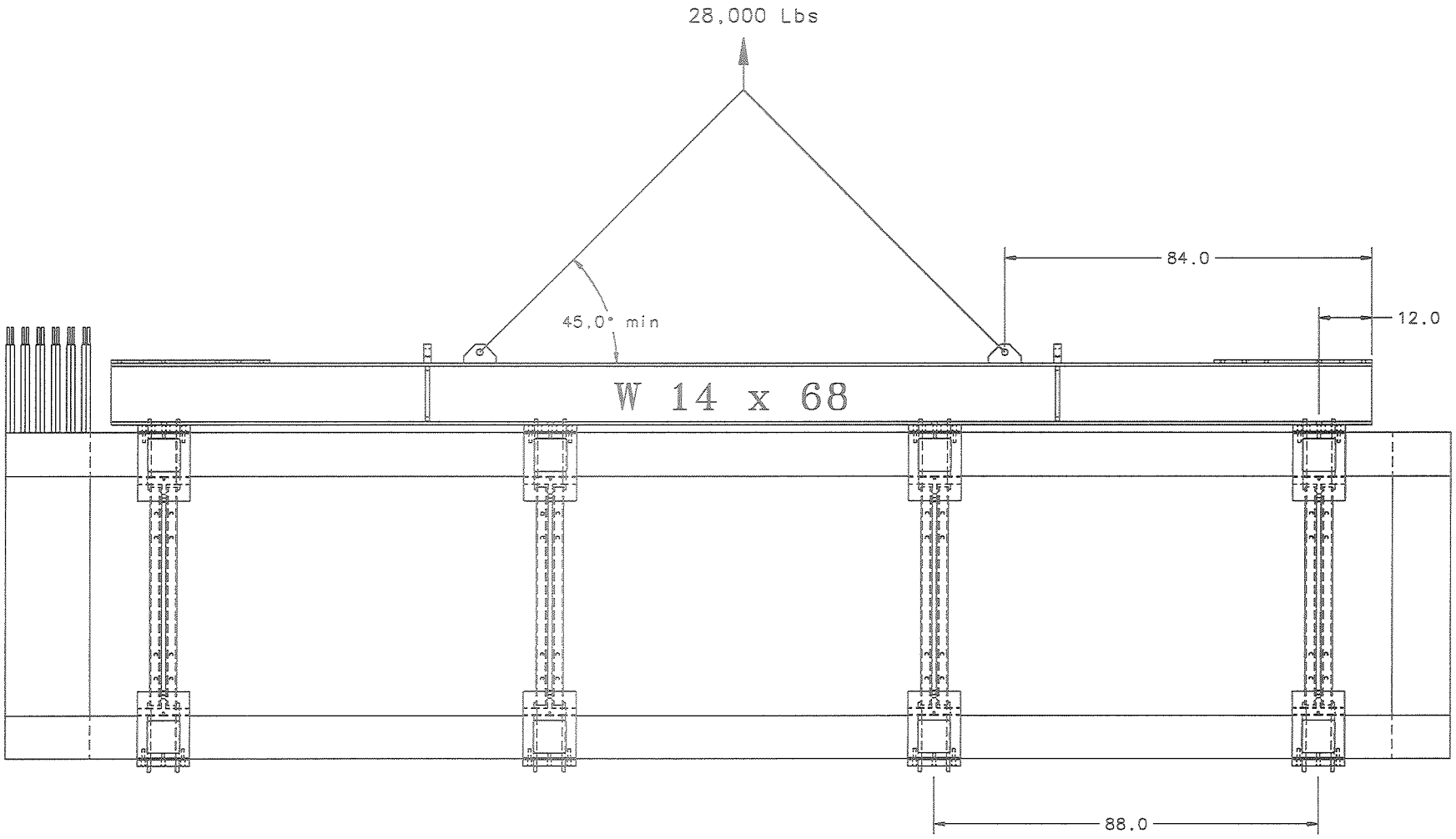
N. Bosse
3-2-89

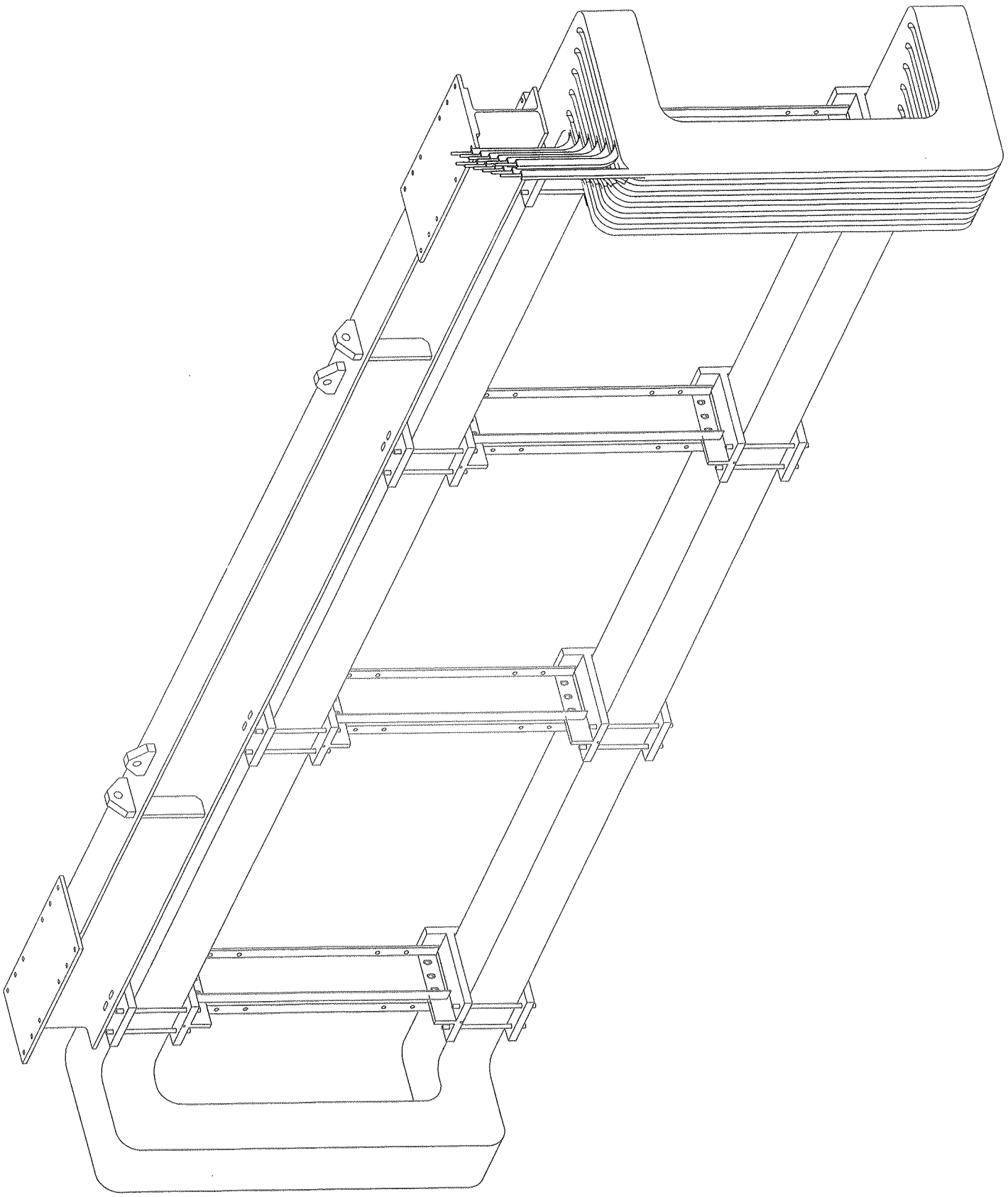
SPREADER BARS TO TEST IN THE NEW MUON LAB.

I.D. N°	Test Wt.	Block Type
15	4100 LBS.	(2) "E" Blocks
16	2700 LBS.	(2) "K" Blocks
17	4724 LBS.	(2) "E" Blocks + (24) Lead Bricks (26 LBS/ea)
26	10100 LBS.	(2) "A" Block
"MAYBE" 3	1400 LBS.	(2) "L" Blocks

SELMA MAGNET COIL LIFTING FIXTURE

VERTICAL POSITION, WORST LOAD ON MAIN BEAM





Main beam analysis:

A finite element beam analysis was performed with the following results:

$\delta_{max} = .145"$

$M_{max} = 510498$ in-lbs

$\left.\begin{aligned} \sigma_{b_{max}} &= 4,957 \text{ psi} \\ \tau_{max_{xy}} &= 366.7 \text{ psi} \end{aligned}\right\}$ at the same point

The combined stress on this beam is:

$\sigma_{max} = 4,984$ psi

$\sigma_{min} = -26.98$ psi

$\tau_{max} = 2,505$ psi

For an A36 wide flange, $F_y = 36,000$ psi

For a lifting fixture with a factor of safety of "3",

$$F_{all} = \frac{1}{3} F_y = 12,000 \text{ psi}$$

$$\tau_{all} = F_{all}/2 = 6,000 \text{ psi}$$

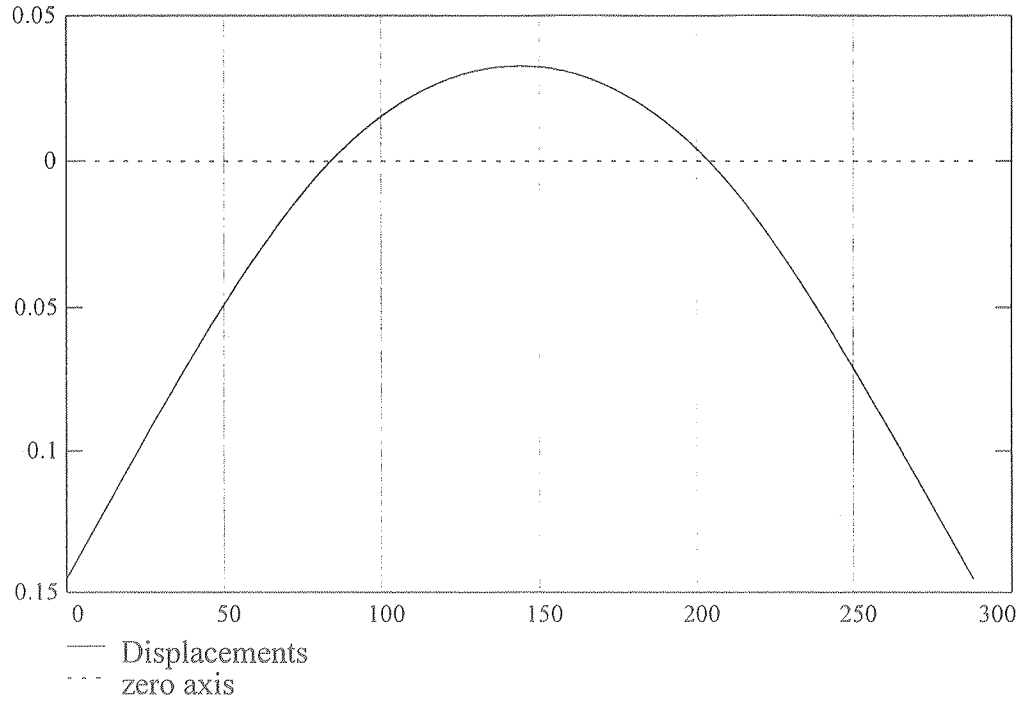
This beam is adequate

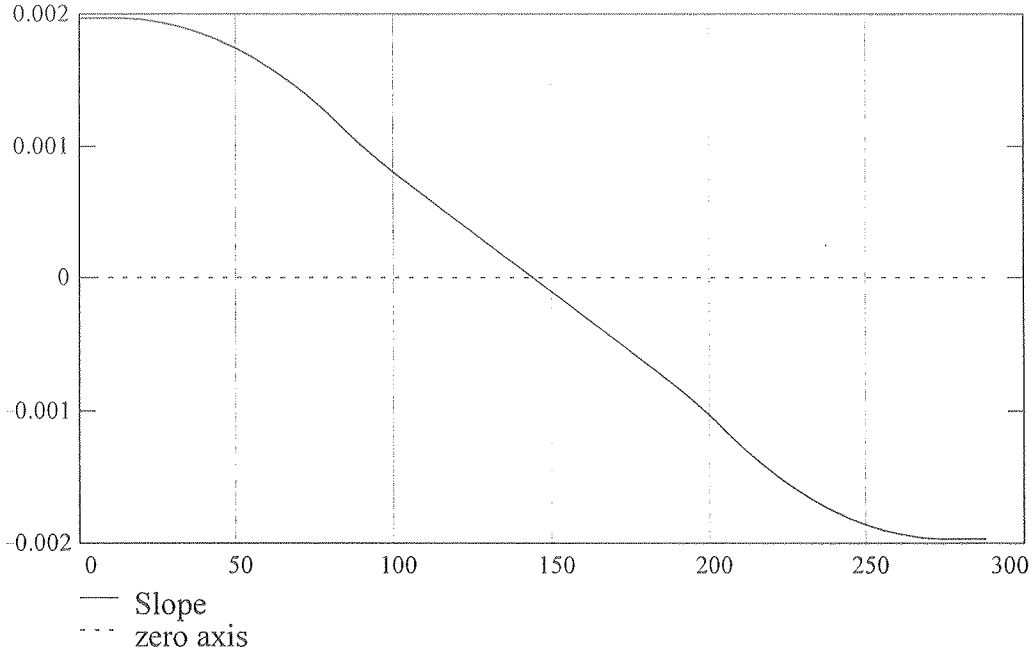
Horizontal Beam with No Axial Loading

Data from Finite Element Modeling Program
from DM Engineering Software

$N := \text{READPRN}(\text{plot1}\ \text{dat})$ $M := \text{READPRN}(\text{plot2}\ \text{dat})$ $P := \text{READPRN}(\text{plot3}\ \text{dat})$

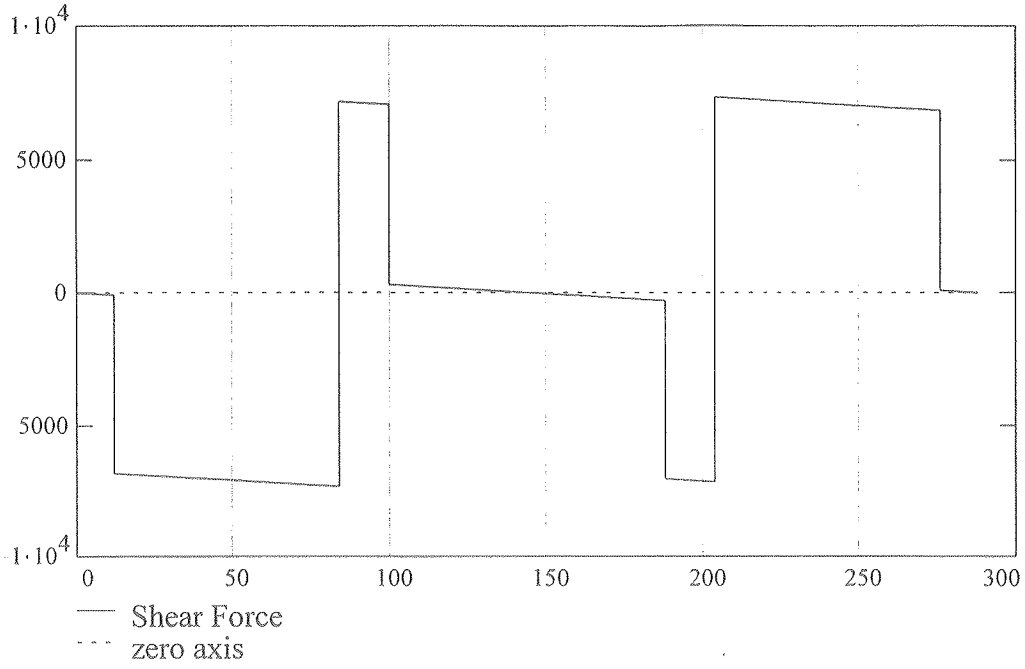
$I := 0 .. N_{(0,0)} - 1$ $L := 0 .. N_{(0,1)} - 1$



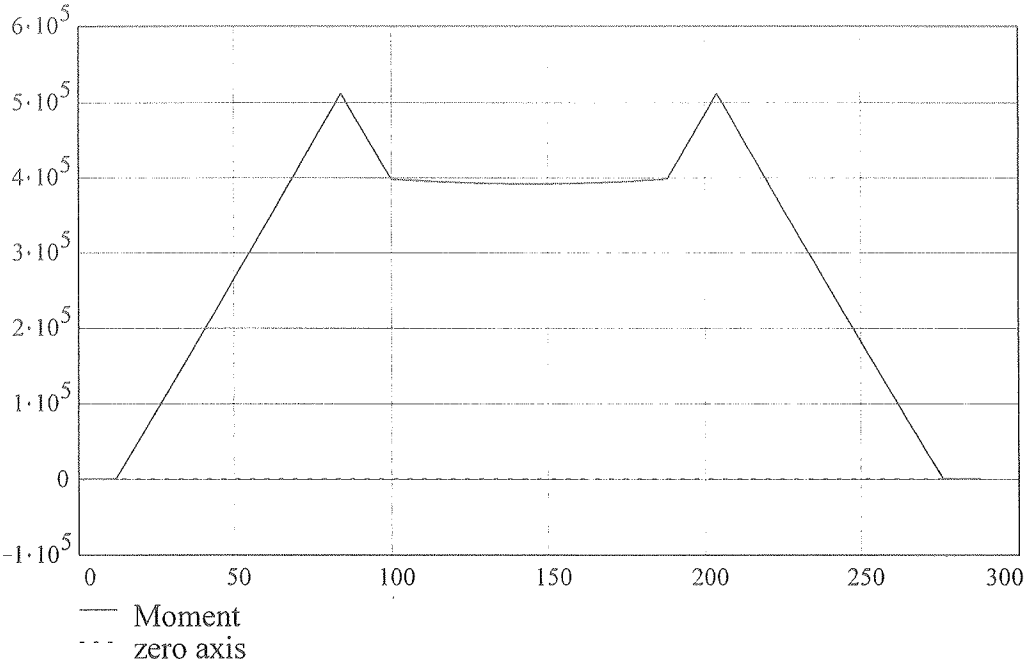


Beam Shear and Moment Diagrams

Shear Diagram



Negative Moment Diagram



HORIZONTAL BEAM WITH NO AXIAL LOADS: INPUT DATA — main beam
(MAXIMUM 25 SEGMENTS) — wide flange

NUMBER OF SEGMENTS
7

SEGMENT NUMBER	SEGMENT LENGTH	MOMENT OF INERTIA	MATERIAL TYPE	BEAM AREA	ELEMENTS PER SEGMENT	UNIFORM LOAD	C
1	12.00	723.000	1	20.00	6	-6.945	7.02
2	72.00	723.000	1	20.00	30	-6.945	7.02
3	16.00	723.000	1	20.00	14	-6.945	7.02
4	88.00	723.000	1	20.00	44	-6.945	7.02
5	16.00	723.000	1	20.00	14	-6.945	7.02
6	72.00	723.000	1	20.00	30	-6.945	7.02
7	12.00	723.000	1	20.00	6	-6.945	7.02

SEGMENT NUMBER	1st END Y-DISPL	1st END SLOPE	2nd END Y-DISPL	2nd END SLOPE	1st END FORCE	1st END MOMENT	2nd END FORCE	2nd END MOMENT
1	999.0	888.0	999.0	888.0	0.0	0.0	-6750.0	0.0
2	999.0	888.0	0.0	888.0	-6750.0	0.0	0.0	0.0
3	0.0	888.0	999.0	888.0	0.0	0.0	-6750.0	0.0
4	999.0	888.0	999.0	888.0	-6750.0	0.0	-6750.0	0.0
5	999.0	888.0	0.0	888.0	-6750.0	0.0	0.0	0.0
6	0.0	888.0	999.0	888.0	0.0	0.0	-6750.0	0.0
7	999.0	888.0	999.0	888.0	-6750.0	0.0	0.0	0.0

NOTES:

INTEGERS MUST NOT HAVE A DECIMAL POINT
REAL NUMBERS MUST HAVE A DECIMAL POINT

999.0 ====> FREE END CONDITION IN Y-DISPLACEMENT

888.0 ====> FREE END CONDITION IN ROTATION

SLOPE IMPLIES A FORCED CONDITION THAT CAUSED A ROTATION IN THE BEAM AT THE POINT OF APPLICATION. (DATA VALUE SHOULD BE "RISE/RUN")

THE VALUE OF "C" IS THE DISTANCE FROM THE BENDING AXIS TO THE DISTANCE WHERE STRESS IS TO BE COMPUTED. FOR MAXIMUM STRESS, THE VALUE OF "C" SHOULD BE THE DISTANCE FROM THE BENDING AXIS TO THE EXTREME FIBERS OF THE BEAM.

MATERIAL TYPE NUMBER COORESPONDS TO THE MATERIAL NUMBER LISTED IN DATA FILE: mtype.dat

THE DATA VALUES LISTED HERE ARE NOT COLUMN SENSITIVE; THEY ARE ONLY SHOWN IN COLUMNS FOR CLARITY!

HORIZONTAL BEAM ANALYSIS USING FEM TECHNIQUES

NODE	GLOBAL COORDINATE
1	0.0000
2	2.0000
3	4.0000
4	6.0000
5	8.0000
6	10.0000
7	12.0000
8	14.4000
9	16.8000
10	19.2000
11	21.6000
12	24.0000
13	26.4000
14	28.8000
15	31.2000
16	33.6000
17	36.0000
18	38.4000
19	40.8000
20	43.2000
21	45.6000
22	48.0000
23	50.4000
24	52.8000
25	55.2000
26	57.6000
27	60.0000
28	62.4000
29	64.8000
30	67.2000
31	69.6000
32	72.0000
33	74.4000
34	76.8000
35	79.2000
36	81.6000
37	84.0000
38	85.1429
39	86.2857
40	87.4286
41	88.5714
42	89.7143
43	90.8571
44	92.0000
45	93.1429
46	94.2857
47	95.4286
48	96.5714
49	97.7143
50	98.8571
51	100.0000
52	102.0000
53	104.0000
54	106.0000
55	108.0000
56	110.0000
57	112.0000
58	114.0000
59	116.0000
60	118.0000
61	120.0000

62	122.0000
63	124.0000
64	126.0000
65	128.0000
66	130.0000
67	132.0000
68	134.0000
69	136.0000
70	138.0000
71	140.0000
72	142.0000
73	144.0000
74	146.0000
75	148.0000
76	150.0000
77	152.0000
78	154.0000
79	156.0000
80	158.0000
81	160.0000
82	162.0000
83	164.0000
84	166.0000
85	168.0000
86	170.0000
87	172.0000
88	174.0000
89	176.0000
90	178.0000
91	180.0000
92	182.0000
93	184.0000
94	186.0000
95	188.0000
96	189.1429
97	190.2857
98	191.4286
99	192.5714
100	193.7143
101	194.8571
102	196.0000
103	197.1429
104	198.2857
105	199.4286
106	200.5714
107	201.7143
108	202.8571
109	204.0000
110	206.4000
111	208.8000
112	211.2000
113	213.6000
114	216.0000
115	218.4000
116	220.8000
117	223.2000
118	225.6000
119	228.0000
120	230.4000
121	232.8000
122	235.2000
123	237.6000
124	240.0000
125	242.4000
126	244.8000
127	247.2000

128	249.6000
129	252.0000
130	254.4000
131	256.8000
132	259.2000
133	261.6000
134	264.0000
135	266.4000
136	268.8000
137	271.2000
138	273.6000
139	276.0000
140	278.0000
141	280.0000
142	282.0000
143	284.0000
144	286.0000
145	288.0000

ELEM NO.	NODAL CONNECTIVITY		INERTIA	EMOD	SPWT	XNU
1	1	2	.723E+03	0.3000E+08	0.000740	.3000
2	2	3	.723E+03	0.3000E+08	0.000740	.3000
3	3	4	.723E+03	0.3000E+08	0.000740	.3000
4	4	5	.723E+03	0.3000E+08	0.000740	.3000
5	5	6	.723E+03	0.3000E+08	0.000740	.3000
6	6	7	.723E+03	0.3000E+08	0.000740	.3000
7	7	8	.723E+03	0.3000E+08	0.000740	.3000
8	8	9	.723E+03	0.3000E+08	0.000740	.3000
9	9	10	.723E+03	0.3000E+08	0.000740	.3000
10	10	11	.723E+03	0.3000E+08	0.000740	.3000
11	11	12	.723E+03	0.3000E+08	0.000740	.3000
12	12	13	.723E+03	0.3000E+08	0.000740	.3000
13	13	14	.723E+03	0.3000E+08	0.000740	.3000
14	14	15	.723E+03	0.3000E+08	0.000740	.3000
15	15	16	.723E+03	0.3000E+08	0.000740	.3000
16	16	17	.723E+03	0.3000E+08	0.000740	.3000
17	17	18	.723E+03	0.3000E+08	0.000740	.3000
18	18	19	.723E+03	0.3000E+08	0.000740	.3000
19	19	20	.723E+03	0.3000E+08	0.000740	.3000
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21	21	22	.723E+03	0.3000E+08	0.000740	.3000
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133	133	134	.723E+03	0.3000E+08	0.000740	.3000
134	134	135	.723E+03	0.3000E+08	0.000740	.3000
135	135	136	.723E+03	0.3000E+08	0.000740	.3000
136	136	137	.723E+03	0.3000E+08	0.000740	.3000
137	137	138	.723E+03	0.3000E+08	0.000740	.3000
138	138	139	.723E+03	0.3000E+08	0.000740	.3000
139	139	140	.723E+03	0.3000E+08	0.000740	.3000
140	140	141	.723E+03	0.3000E+08	0.000740	.3000
141	141	142	.723E+03	0.3000E+08	0.000740	.3000
142	142	143	.723E+03	0.3000E+08	0.000740	.3000
143	143	144	.723E+03	0.3000E+08	0.000740	.3000
144	144	145	.723E+03	0.3000E+08	0.000740	.3000

NODAL DISPLACEMENTS	Y-DISPL	SLOPE
NODE 1	-0.145328	0.001968
NODE 2	-0.141391	0.001968
NODE 3	-0.137454	0.001968
NODE 4	-0.133517	0.001968
NODE 5	-0.129580	0.001968
NODE 6	-0.125643	0.001968
NODE 7	-0.121707	0.001968
NODE 8	-0.116983	0.001967
NODE 9	-0.112264	0.001965
NODE 10	-0.107555	0.001960
NODE 11	-0.102858	0.001954
NODE 12	-0.098179	0.001945
NODE 13	-0.093522	0.001935
NODE 14	-0.088891	0.001923
NODE 15	-0.084291	0.001909
NODE 16	-0.079727	0.001894
NODE 17	-0.075202	0.001876
NODE 18	-0.070722	0.001857
NODE 19	-0.066290	0.001836
NODE 20	-0.061912	0.001813
NODE 21	-0.057591	0.001788
NODE 22	-0.053332	0.001761
NODE 23	-0.049140	0.001732
NODE 24	-0.045019	0.001702
NODE 25	-0.040974	0.001669
NODE 26	-0.037009	0.001635
NODE 27	-0.033129	0.001598

NODE 28	-0.029338	0.001560
NODE 29	-0.025641	0.001520
NODE 30	-0.022043	0.001478
NODE 31	-0.018547	0.001434
NODE 32	-0.015160	0.001388
NODE 33	-0.011885	0.001341
NODE 34	-0.008727	0.001291
NODE 35	-0.005690	0.001239
NODE 36	-0.002779	0.001186
NODE 37	0.000000	0.001130
NODE 38	0.001276	0.001104
NODE 39	0.002522	0.001077
NODE 40	0.003739	0.001051
NODE 41	0.004926	0.001026
NODE 42	0.006084	0.001001
NODE 43	0.007214	0.000977
NODE 44	0.008317	0.000952
NODE 45	0.009392	0.000929
NODE 46	0.010440	0.000906
NODE 47	0.011462	0.000883
NODE 48	0.012457	0.000860
NODE 49	0.013428	0.000838
NODE 50	0.014374	0.000817
NODE 51	0.015295	0.000796
NODE 52	0.016850	0.000759
NODE 53	0.018332	0.000723
NODE 54	0.019741	0.000686
NODE 55	0.021077	0.000650
NODE 56	0.022340	0.000613
NODE 57	0.023530	0.000577
NODE 58	0.024648	0.000541
NODE 59	0.025694	0.000505
NODE 60	0.026667	0.000468
NODE 61	0.027568	0.000432
NODE 62	0.028396	0.000396
NODE 63	0.029152	0.000360
NODE 64	0.029836	0.000324
NODE 65	0.030448	0.000288
NODE 66	0.030988	0.000252
NODE 67	0.031456	0.000216
NODE 68	0.031851	0.000180
NODE 69	0.032175	0.000144
NODE 70	0.032427	0.000108
NODE 71	0.032607	0.000072
NODE 72	0.032715	0.000036
NODE 73	0.032751	0.000000
NODE 74	0.032715	-0.000036
NODE 75	0.032607	-0.000072
NODE 76	0.032427	-0.000108
NODE 77	0.032175	-0.000144
NODE 78	0.031851	-0.000180
NODE 79	0.031456	-0.000216
NODE 80	0.030988	-0.000252
NODE 81	0.030448	-0.000288
NODE 82	0.029836	-0.000324
NODE 83	0.029152	-0.000360
NODE 84	0.028396	-0.000396
NODE 85	0.027568	-0.000432
NODE 86	0.026667	-0.000468
NODE 87	0.025694	-0.000505
NODE 88	0.024648	-0.000541
NODE 89	0.023530	-0.000577
NODE 90	0.022340	-0.000613
NODE 91	0.021077	-0.000650
NODE 92	0.019741	-0.000686
NODE 93	0.018332	-0.000723

NODE 94	0.016850	-0.000759
NODE 95	0.015295	-0.000796
NODE 96	0.014374	-0.000817
NODE 97	0.013428	-0.000838
NODE 98	0.012457	-0.000860
NODE 99	0.011462	-0.000883
NODE100	0.010440	-0.000906
NODE101	0.009392	-0.000929
NODE102	0.008317	-0.000952
NODE103	0.007214	-0.000977
NODE104	0.006084	-0.001001
NODE105	0.004926	-0.001026
NODE106	0.003739	-0.001051
NODE107	0.002522	-0.001077
NODE108	0.001276	-0.001104
NODE109	0.000000	-0.001130
NODE110	-0.002779	-0.001186
NODE111	-0.005690	-0.001239
NODE112	-0.008727	-0.001291
NODE113	-0.011885	-0.001341
NODE114	-0.015160	-0.001388
NODE115	-0.018547	-0.001434
NODE116	-0.022043	-0.001478
NODE117	-0.025641	-0.001520
NODE118	-0.029338	-0.001560
NODE119	-0.033129	-0.001598
NODE120	-0.037009	-0.001635
NODE121	-0.040974	-0.001669
NODE122	-0.045019	-0.001702
NODE123	-0.049140	-0.001732
NODE124	-0.053332	-0.001761
NODE125	-0.057591	-0.001788
NODE126	-0.061912	-0.001813
NODE127	-0.066290	-0.001836
NODE128	-0.070722	-0.001857
NODE129	-0.075202	-0.001876
NODE130	-0.079727	-0.001894
NODE131	-0.084291	-0.001909
NODE132	-0.088891	-0.001923
NODE133	-0.093522	-0.001935
NODE134	-0.098179	-0.001945
NODE135	-0.102858	-0.001954
NODE136	-0.107555	-0.001960
NODE137	-0.112264	-0.001965
NODE138	-0.116983	-0.001967
NODE139	-0.121707	-0.001968
NODE140	-0.125643	-0.001968
NODE141	-0.129580	-0.001968
NODE142	-0.133517	-0.001968
NODE143	-0.137454	-0.001968
NODE144	-0.141391	-0.001968
NODE145	-0.145328	-0.001968

NODAL REACTIONS	Y-FORCE	MOMENT
NODE 1	0.0000	0.0000
NODE 2	0.0000	0.0000
NODE 3	0.0000	0.0000
NODE 4	0.0000	0.0000
NODE 5	0.0000	0.0000
NODE 6	0.0000	0.0000
NODE 7	-6750.0000	0.0000
NODE 8	0.0000	0.0000
NODE 9	0.0000	0.0000
NODE 10	0.0000	0.0000

NODE 11	0.0000	0.0000
NODE 12	0.0000	0.0000
NODE 13	0.0000	0.0000
NODE 14	0.0000	0.0000
NODE 15	0.0000	0.0000
NODE 16	0.0000	0.0000
NODE 17	0.0000	0.0000
NODE 18	0.0000	0.0000
NODE 19	0.0000	0.0000
NODE 20	0.0000	0.0000
NODE 21	0.0000	0.0000
NODE 22	0.0000	0.0000
NODE 23	0.0000	0.0000
NODE 24	0.0000	0.0000
NODE 25	0.0000	0.0000
NODE 26	0.0000	0.0000
NODE 27	0.0000	0.0000
NODE 28	0.0000	0.0000
NODE 29	0.0000	0.0000
NODE 30	0.0000	0.0000
NODE 31	0.0000	0.0000
NODE 32	0.0000	0.0000
NODE 33	0.0000	0.0000
NODE 34	0.0000	0.0000
NODE 35	0.0000	0.0000
NODE 36	0.0000	0.0000
NODE 37	14500.0800	0.0000
NODE 38	0.0000	0.0000
NODE 39	0.0000	0.0000
NODE 40	0.0000	0.0000
NODE 41	0.0000	0.0000
NODE 42	0.0000	0.0000
NODE 43	0.0000	0.0000
NODE 44	0.0000	0.0000
NODE 45	0.0000	0.0000
NODE 46	0.0000	0.0000
NODE 47	0.0000	0.0000
NODE 48	0.0000	0.0000
NODE 49	0.0000	0.0000
NODE 50	0.0000	0.0000
NODE 51	-6750.0000	0.0000
NODE 52	0.0000	0.0000
NODE 53	0.0000	0.0000
NODE 54	0.0000	0.0000
NODE 55	0.0000	0.0000
NODE 56	0.0000	0.0000
NODE 57	0.0000	0.0000
NODE 58	0.0000	0.0000
NODE 59	0.0000	0.0000
NODE 60	0.0000	0.0000
NODE 61	0.0000	0.0000
NODE 62	0.0000	0.0000
NODE 63	0.0000	0.0000
NODE 64	0.0000	0.0000
NODE 65	0.0000	0.0000
NODE 66	0.0000	0.0000
NODE 67	0.0000	0.0000
NODE 68	0.0000	0.0000
NODE 69	0.0000	0.0000
NODE 70	0.0000	0.0000
NODE 71	0.0000	0.0000
NODE 72	0.0000	0.0000
NODE 73	0.0000	0.0000
NODE 74	0.0000	0.0000
NODE 75	0.0000	0.0000
NODE 76	0.0000	0.0000

NODE 77	0.0000	0.0000
NODE 78	0.0000	0.0000
NODE 79	0.0000	0.0000
NODE 80	0.0000	0.0000
NODE 81	0.0000	0.0000
NODE 82	0.0000	0.0000
NODE 83	0.0000	0.0000
NODE 84	0.0000	0.0000
NODE 85	0.0000	0.0000
NODE 86	0.0000	0.0000
NODE 87	0.0000	0.0000
NODE 88	0.0000	0.0000
NODE 89	0.0000	0.0000
NODE 90	0.0000	0.0000
NODE 91	0.0000	0.0000
NODE 92	0.0000	0.0000
NODE 93	0.0000	0.0000
NODE 94	0.0000	0.0000
NODE 95	-6750.0000	0.0000
NODE 96	0.0000	0.0000
NODE 97	0.0000	0.0000
NODE 98	0.0000	0.0000
NODE 99	0.0000	0.0000
NODE100	0.0000	0.0000
NODE101	0.0000	0.0000
NODE102	0.0000	0.0000
NODE103	0.0000	0.0000
NODE104	0.0000	0.0000
NODE105	0.0000	0.0000
NODE106	0.0000	0.0000
NODE107	0.0000	0.0000
NODE108	0.0000	0.0000
NODE109	14500.0800	0.0000
NODE110	0.0000	0.0000
NODE111	0.0000	0.0000
NODE112	0.0000	0.0000
NODE113	0.0000	0.0000
NODE114	0.0000	0.0000
NODE115	0.0000	0.0000
NODE116	0.0000	0.0000
NODE117	0.0000	0.0000
NODE118	0.0000	0.0000
NODE119	0.0000	0.0000
NODE120	0.0000	0.0000
NODE121	0.0000	0.0000
NODE122	0.0000	0.0000
NODE123	0.0000	0.0000
NODE124	0.0000	0.0000
NODE125	0.0000	0.0000
NODE126	0.0000	0.0000
NODE127	0.0000	0.0000
NODE128	0.0000	0.0000
NODE129	0.0000	0.0000
NODE130	0.0000	0.0000
NODE131	0.0000	0.0000
NODE132	0.0000	0.0000
NODE133	0.0000	0.0000
NODE134	0.0000	0.0000
NODE135	0.0000	0.0000
NODE136	0.0000	0.0000
NODE137	0.0000	0.0000
NODE138	0.0000	0.0000
NODE139	-6750.0000	0.0000
NODE140	0.0000	0.0000
NODE141	0.0000	0.0000
NODE142	0.0000	0.0000

NODE143	0.0000	0.0000
NODE144	0.0000	0.0000
NODE145	0.0000	0.0000

ELEMENTAL SHEAR FORCES	LEFT	CENTER	RIGHT
ELEMENT 1	0.0000	-6.9450	-13.8900
ELEMENT 2	13.8900	-20.8350	-27.7800
ELEMENT 3	27.7800	-34.7250	-41.6700
ELEMENT 4	41.6700	-48.6150	-55.5600
ELEMENT 5	55.5600	-62.5050	-69.4500
ELEMENT 6	69.4500	-76.3950	-83.3400
ELEMENT 7	6833.3400	-6841.6740	-6850.0080
ELEMENT 8	6850.0080	-6858.3420	-6866.6760
ELEMENT 9	6866.6760	-6875.0100	-6883.3440
ELEMENT 10	6883.3440	-6891.6780	-6900.0120
ELEMENT 11	6900.0120	-6908.3460	-6916.6800
ELEMENT 12	6916.6800	-6925.0140	-6933.3480
ELEMENT 13	6933.3480	-6941.6820	-6950.0160
ELEMENT 14	6950.0160	-6958.3500	-6966.6840
ELEMENT 15	6966.6840	-6975.0180	-6983.3520
ELEMENT 16	6983.3520	-6991.6860	-7000.0200
ELEMENT 17	7000.0200	-7008.3540	-7016.6880
ELEMENT 18	7016.6880	-7025.0220	-7033.3560
ELEMENT 19	7033.3560	-7041.6900	-7050.0240
ELEMENT 20	7050.0240	-7058.3580	-7066.6920
ELEMENT 21	7066.6920	-7075.0260	-7083.3600
ELEMENT 22	7083.3600	-7091.6940	-7100.0280
ELEMENT 23	7100.0280	-7108.3620	-7116.6960
ELEMENT 24	7116.6960	-7125.0300	-7133.3640
ELEMENT 25	7133.3640	-7141.6980	-7150.0320
ELEMENT 26	7150.0320	-7158.3660	-7166.7000
ELEMENT 27	7166.7000	-7175.0340	-7183.3680
ELEMENT 28	7183.3680	-7191.7020	-7200.0360
ELEMENT 29	7200.0360	-7208.3700	-7216.7040
ELEMENT 30	7216.7040	-7225.0380	-7233.3720
ELEMENT 31	7233.3720	-7241.7060	-7250.0400
ELEMENT 32	7250.0400	-7258.3740	-7266.7080
ELEMENT 33	7266.7080	-7275.0420	-7283.3760
ELEMENT 34	7283.3760	-7291.7100	-7300.0440
ELEMENT 35	7300.0440	-7308.3780	-7316.7120
ELEMENT 36	7316.7120	-7325.0460	-7333.3800
ELEMENT 37	-7166.7000	7162.7314	7158.7629
ELEMENT 38	-7158.7629	7154.7943	7150.8257
ELEMENT 39	-7150.8257	7146.8571	7142.8886
ELEMENT 40	-7142.8886	7138.9200	7134.9514
ELEMENT 41	-7134.9514	7130.9829	7127.0143
ELEMENT 42	-7127.0143	7123.0457	7119.0771
ELEMENT 43	-7119.0771	7115.1086	7111.1400
ELEMENT 44	-7111.1400	7107.1714	7103.2029
ELEMENT 45	-7103.2029	7099.2343	7095.2657
ELEMENT 46	-7095.2657	7091.2971	7087.3286
ELEMENT 47	-7087.3286	7083.3600	7079.3914
ELEMENT 48	-7079.3914	7075.4229	7071.4543
ELEMENT 49	-7071.4543	7067.4857	7063.5171
ELEMENT 50	-7063.5171	7059.5486	7055.5800
ELEMENT 51	-305.5800	298.6350	291.6900
ELEMENT 52	-291.6900	284.7450	277.8000
ELEMENT 53	-277.8000	270.8550	263.9100
ELEMENT 54	-263.9100	256.9650	250.0200
ELEMENT 55	-250.0200	243.0750	236.1300
ELEMENT 56	-236.1300	229.1850	222.2400
ELEMENT 57	-222.2400	215.2950	208.3500
ELEMENT 58	-208.3500	201.4050	194.4600
ELEMENT 59	-194.4600	187.5150	180.5700

ELEMENT 60	-180.5700	173.6250	166.6800
ELEMENT 61	-166.6800	159.7350	152.7900
ELEMENT 62	-152.7900	145.8450	138.9000
ELEMENT 63	-138.9000	131.9550	125.0100
ELEMENT 64	-125.0100	118.0650	111.1200
ELEMENT 65	-111.1200	104.1750	97.2300
ELEMENT 66	-97.2300	90.2850	83.3400
ELEMENT 67	-83.3400	76.3950	69.4500
ELEMENT 68	-69.4500	62.5050	55.5600
ELEMENT 69	-55.5600	48.6150	41.6700
ELEMENT 70	-41.6700	34.7250	27.7800
ELEMENT 71	-27.7800	20.8350	13.8900
ELEMENT 72	-13.8900	6.9450	0.0000
ELEMENT 73	0.0000	-6.9450	-13.8900
ELEMENT 74	13.8900	-20.8350	-27.7800
ELEMENT 75	27.7800	-34.7250	-41.6700
ELEMENT 76	41.6700	-48.6150	-55.5600
ELEMENT 77	55.5600	-62.5050	-69.4500
ELEMENT 78	69.4500	-76.3950	-83.3400
ELEMENT 79	83.3400	-90.2850	-97.2300
ELEMENT 80	97.2300	-104.1750	-111.1200
ELEMENT 81	111.1200	-118.0650	-125.0100
ELEMENT 82	125.0100	-131.9550	-138.9000
ELEMENT 83	138.9000	-145.8450	-152.7900
ELEMENT 84	152.7900	-159.7350	-166.6800
ELEMENT 85	166.6800	-173.6250	-180.5700
ELEMENT 86	180.5700	-187.5150	-194.4600
ELEMENT 87	194.4600	-201.4050	-208.3500
ELEMENT 88	208.3500	-215.2950	-222.2400
ELEMENT 89	222.2400	-229.1850	-236.1300
ELEMENT 90	236.1300	-243.0750	-250.0200
ELEMENT 91	250.0200	-256.9650	-263.9100
ELEMENT 92	263.9100	-270.8550	-277.8000
ELEMENT 93	277.8000	-284.7450	-291.6900
ELEMENT 94	291.6900	-298.6350	-305.5800
ELEMENT 95	7055.5800	-7059.5486	-7063.5171
ELEMENT 96	7063.5171	-7067.4857	-7071.4543
ELEMENT 97	7071.4543	-7075.4229	-7079.3914
ELEMENT 98	7079.3914	-7083.3600	-7087.3286
ELEMENT 99	7087.3286	-7091.2971	-7095.2657
ELEMENT100	7095.2657	-7099.2343	-7103.2029
ELEMENT101	7103.2029	-7107.1714	-7111.1400
ELEMENT102	7111.1400	-7115.1086	-7119.0771
ELEMENT103	7119.0771	-7123.0457	-7127.0143
ELEMENT104	7127.0143	-7130.9829	-7134.9514
ELEMENT105	7134.9514	-7138.9200	-7142.8886
ELEMENT106	7142.8886	-7146.8571	-7150.8257
ELEMENT107	7150.8257	-7154.7943	-7158.7629
ELEMENT108	7158.7629	-7162.7314	-7166.7000
ELEMENT109	-7333.3800	7325.0460	7316.7120
ELEMENT110	-7316.7120	7308.3780	7300.0440
ELEMENT111	-7300.0440	7291.7100	7283.3760
ELEMENT112	-7283.3760	7275.0420	7266.7080
ELEMENT113	-7266.7080	7258.3740	7250.0400
ELEMENT114	-7250.0400	7241.7060	7233.3720
ELEMENT115	-7233.3720	7225.0380	7216.7040
ELEMENT116	-7216.7040	7208.3700	7200.0360
ELEMENT117	-7200.0360	7191.7020	7183.3680
ELEMENT118	-7183.3680	7175.0340	7166.7000
ELEMENT119	-7166.7000	7158.3660	7150.0320
ELEMENT120	-7150.0320	7141.6980	7133.3640
ELEMENT121	-7133.3640	7125.0300	7116.6960
ELEMENT122	-7116.6960	7108.3620	7100.0280
ELEMENT123	-7100.0280	7091.6940	7083.3600
ELEMENT124	-7083.3600	7075.0260	7066.6920
ELEMENT125	-7066.6920	7058.3580	7050.0240

ELEMENT126	-7050.0240	7041.6900	7033.3560
ELEMENT127	-7033.3560	7025.0220	7016.6880
ELEMENT128	-7016.6880	7008.3540	7000.0200
ELEMENT129	-7000.0200	6991.6860	6983.3520
ELEMENT130	-6983.3520	6975.0180	6966.6840
ELEMENT131	-6966.6840	6958.3500	6950.0160
ELEMENT132	-6950.0160	6941.6820	6933.3480
ELEMENT133	-6933.3480	6925.0140	6916.6800
ELEMENT134	-6916.6800	6908.3460	6900.0120
ELEMENT135	-6900.0120	6891.6780	6883.3440
ELEMENT136	-6883.3440	6875.0100	6866.6760
ELEMENT137	-6866.6760	6858.3420	6850.0080
ELEMENT138	-6850.0080	6841.6740	6833.3400
ELEMENT139	-83.3400	76.3950	69.4500
ELEMENT140	-69.4500	62.5050	55.5600
ELEMENT141	-55.5600	48.6150	41.6700
ELEMENT142	-41.6700	34.7250	27.7800
ELEMENT143	-27.7800	20.8350	13.8900
ELEMENT144	-13.8900	6.9450	0.0000

ELEMENTAL MOMENTS AT	LEFT	CENTER	RIGHT
ELEMENT 1	2.3150	-4.6300	-11.5750
ELEMENT 2	-11.5750	-32.4100	-53.2450
ELEMENT 3	-53.2450	-87.9700	-122.6950
ELEMENT 4	-122.6950	-171.3100	-219.9250
ELEMENT 5	-219.9250	-282.4300	-344.9350
ELEMENT 6	-344.9350	-421.3300	-497.7250
ELEMENT 7	-496.7064	-8706.7152	-16916.7240
ELEMENT 8	-16916.7240	-25146.7344	-33376.7448
ELEMENT 9	-33376.7448	-41626.7568	-49876.7688
ELEMENT 10	-49876.7688	-58146.7824	-66416.7960
ELEMENT 11	-66416.7960	-74706.8112	-82996.8264
ELEMENT 12	-82996.8264	-91306.8432	-99616.8600
ELEMENT 13	-99616.8600	-107946.8784	-116276.8968
ELEMENT 14	-116276.8968	-124626.9168	-132976.9368
ELEMENT 15	-132976.9368	-141346.9584	-149716.9800
ELEMENT 16	-149716.9800	-158107.0032	-166497.0264
ELEMENT 17	-166497.0264	-174907.0512	-183317.0760
ELEMENT 18	-183317.0760	-191747.1024	-200177.1288
ELEMENT 19	-200177.1288	-208627.1568	-217077.1848
ELEMENT 20	-217077.1848	-225547.2144	-234017.2440
ELEMENT 21	-234017.2440	-242507.2752	-250997.3064
ELEMENT 22	-250997.3064	-259507.3392	-268017.3720
ELEMENT 23	-268017.3720	-276547.4064	-285077.4408
ELEMENT 24	-285077.4408	-293627.4768	-302177.5128
ELEMENT 25	-302177.5128	-310747.5504	-319317.5880
ELEMENT 26	-319317.5880	-327907.6272	-336497.6664
ELEMENT 27	-336497.6664	-345107.7072	-353717.7480
ELEMENT 28	-353717.7480	-362347.7904	-370977.8328
ELEMENT 29	-370977.8328	-379627.8768	-388277.9208
ELEMENT 30	-388277.9208	-396947.9664	-405618.0120
ELEMENT 31	-405618.0120	-414308.0592	-422998.1064
ELEMENT 32	-422998.1064	-431708.1552	-440418.2040
ELEMENT 33	-440418.2040	-449148.2544	-457878.3048
ELEMENT 34	-457878.3048	-466628.3568	-475378.4088
ELEMENT 35	-475378.4088	-484148.4624	-492918.5160
ELEMENT 36	-492918.5160	-501708.5712	-510498.6264 ← M_{max}
ELEMENT 37	-510501.2041	-506408.2147	-502315.2253
ELEMENT 38	-502315.2253	-498226.7714	-494138.3176
ELEMENT 39	-494138.3176	-490054.3992	-485970.4808
ELEMENT 40	-485970.4808	-481891.0980	-477811.7151
ELEMENT 41	-477811.7151	-473736.8678	-469662.0204
ELEMENT 42	-469662.0204	-465591.7086	-461521.3967
ELEMENT 43	-461521.3967	-457455.6204	-453389.8441

ELEMENT 44	-453389.8441	-449328.6033	-445267.3624
ELEMENT 45	-445267.3624	-441210.6571	-437153.9518
ELEMENT 46	-437153.9518	-433101.7820	-429049.6122
ELEMENT 47	-429049.6122	-425001.9780	-420954.3437
ELEMENT 48	-420954.3437	-416911.2449	-412868.1461
ELEMENT 49	-412868.1461	-408829.5829	-404791.0196
ELEMENT 50	-404791.0196	-400756.9918	-396722.9641
ELEMENT 51	-396721.4050	-396422.7700	-396124.1350
ELEMENT 52	-396124.1350	-395839.3900	-395554.6450
ELEMENT 53	-395554.6450	-395283.7900	-395012.9350
ELEMENT 54	-395012.9350	-394755.9700	-394499.0050
ELEMENT 55	-394499.0050	-394255.9300	-394012.8550
ELEMENT 56	-394012.8550	-393783.6700	-393554.4850
ELEMENT 57	-393554.4850	-393339.1900	-393123.8950
ELEMENT 58	-393123.8950	-392922.4900	-392721.0850
ELEMENT 59	-392721.0850	-392533.5700	-392346.0550
ELEMENT 60	-392346.0550	-392172.4300	-391998.8050
ELEMENT 61	-391998.8050	-391839.0700	-391679.3350
ELEMENT 62	-391679.3350	-391533.4900	-391387.6450
ELEMENT 63	-391387.6450	-391255.6900	-391123.7350
ELEMENT 64	-391123.7350	-391005.6700	-390887.6050
ELEMENT 65	-390887.6050	-390783.4300	-390679.2550
ELEMENT 66	-390679.2550	-390588.9700	-390498.6850
ELEMENT 67	-390498.6850	-390422.2900	-390345.8950
ELEMENT 68	-390345.8950	-390283.3900	-390220.8850
ELEMENT 69	-390220.8850	-390172.2700	-390123.6550
ELEMENT 70	-390123.6550	-390088.9300	-390054.2050
ELEMENT 71	-390054.2050	-390033.3700	-390012.5350
ELEMENT 72	-390012.5350	-390005.5900	-389998.6450
ELEMENT 73	-389998.6450	-390005.5900	-390012.5350
ELEMENT 74	-390012.5350	-390033.3700	-390054.2050
ELEMENT 75	-390054.2050	-390088.9300	-390123.6550
ELEMENT 76	-390123.6550	-390172.2700	-390220.8850
ELEMENT 77	-390220.8850	-390283.3900	-390345.8950
ELEMENT 78	-390345.8950	-390422.2900	-390498.6850
ELEMENT 79	-390498.6850	-390588.9700	-390679.2550
ELEMENT 80	-390679.2550	-390783.4300	-390887.6050
ELEMENT 81	-390887.6050	-391005.6700	-391123.7350
ELEMENT 82	-391123.7350	-391255.6900	-391387.6450
ELEMENT 83	-391387.6450	-391533.4900	-391679.3350
ELEMENT 84	-391679.3350	-391839.0700	-391998.8050
ELEMENT 85	-391998.8050	-392172.4300	-392346.0550
ELEMENT 86	-392346.0550	-392533.5700	-392721.0850
ELEMENT 87	-392721.0850	-392922.4900	-393123.8950
ELEMENT 88	-393123.8950	-393339.1900	-393554.4850
ELEMENT 89	-393554.4850	-393783.6700	-394012.8550
ELEMENT 90	-394012.8550	-394255.9301	-394499.0051
ELEMENT 91	-394499.0051	-394755.9701	-395012.9351
ELEMENT 92	-395012.9351	-395283.7901	-395554.6451
ELEMENT 93	-395554.6451	-395839.3901	-396124.1351
ELEMENT 94	-396124.1351	-396422.7701	-396721.4051
ELEMENT 95	-396722.9641	-400756.9919	-404791.0197
ELEMENT 96	-404791.0197	-408829.5829	-412868.1462
ELEMENT 97	-412868.1462	-416911.2450	-420954.3437
ELEMENT 98	-420954.3437	-425001.9780	-429049.6123
ELEMENT 99	-429049.6123	-433101.7821	-437153.9519
ELEMENT100	-437153.9519	-441210.6572	-445267.3625
ELEMENT101	-445267.3625	-449328.6033	-453389.8442
ELEMENT102	-453389.8442	-457455.6205	-461521.3968
ELEMENT103	-461521.3968	-465591.7086	-469662.0205
ELEMENT104	-469662.0205	-473736.8678	-477811.7152
ELEMENT105	-477811.7152	-481891.0980	-485970.4809
ELEMENT106	-485970.4809	-490054.3993	-494138.3176
ELEMENT107	-494138.3176	-498226.7715	-502315.2254
ELEMENT108	-502315.2254	-506408.2148	-510501.2042
ELEMENT109	-510498.6265	-501708.5713	-492918.5161

ELEMENT110	-492918.5161	-484148.4625	-475378.4089
ELEMENT111	-475378.4089	-466628.3569	-457878.3049
ELEMENT112	-457878.3049	-449148.2545	-440418.2041
ELEMENT113	-440418.2041	-431708.1553	-422998.1065
ELEMENT114	-422998.1065	-414308.0593	-405618.0121
ELEMENT115	-405618.0121	-396947.9665	-388277.9209
ELEMENT116	-388277.9209	-379627.8769	-370977.8329
ELEMENT117	-370977.8329	-362347.7905	-353717.7481
ELEMENT118	-353717.7481	-345107.7073	-336497.6665
ELEMENT119	-336497.6665	-327907.6273	-319317.5880
ELEMENT120	-319317.5880	-310747.5504	-302177.5128
ELEMENT121	-302177.5128	-293627.4768	-285077.4408
ELEMENT122	-285077.4408	-276547.4064	-268017.3720
ELEMENT123	-268017.3720	-259507.3392	-250997.3064
ELEMENT124	-250997.3064	-242507.2752	-234017.2440
ELEMENT125	-234017.2440	-225547.2144	-217077.1848
ELEMENT126	-217077.1848	-208627.1568	-200177.1288
ELEMENT127	-200177.1288	-191747.1024	-183317.0760
ELEMENT128	-183317.0760	-174907.0512	-166497.0264
ELEMENT129	-166497.0264	-158107.0032	-149716.9800
ELEMENT130	-149716.9800	-141346.9584	-132976.9368
ELEMENT131	-132976.9368	-124626.9168	-116276.8968
ELEMENT132	-116276.8968	-107946.8784	-99616.8600
ELEMENT133	-99616.8600	-91306.8432	-82996.8264
ELEMENT134	-82996.8264	-74706.8112	-66416.7960
ELEMENT135	-66416.7960	-58146.7824	-49876.7688
ELEMENT136	-49876.7688	-41626.7568	-33376.7448
ELEMENT137	-33376.7448	-25146.7344	-16916.7240
ELEMENT138	-16916.7240	-8706.7152	-496.7064
ELEMENT139	-497.7250	-421.3300	-344.9350
ELEMENT140	-344.9350	-282.4300	-219.9250
ELEMENT141	-219.9250	-171.3100	-122.6950
ELEMENT142	-122.6950	-87.9700	-53.2450
ELEMENT143	-53.2450	-32.4100	-11.5750
ELEMENT144	-11.5750	-4.6300	2.3150

ELEMENT STRAIN	LEFT	CENTER	RIGHT
ELEMENT 1	0.7493E-09	-0.1499E-08	-0.3746E-08
ELEMENT 2	-0.3746E-08	-0.1049E-07	-0.1723E-07
ELEMENT 3	-0.1723E-07	-0.2847E-07	-0.3971E-07
ELEMENT 4	-0.3971E-07	-0.5544E-07	-0.7118E-07
ELEMENT 5	-0.7118E-07	-0.9141E-07	-0.1116E-06
ELEMENT 6	-0.1116E-06	-0.1364E-06	-0.1611E-06
ELEMENT 7	-0.1608E-06	-0.2818E-05	-0.5475E-05
ELEMENT 8	-0.5475E-05	-0.8139E-05	-0.1080E-04
ELEMENT 9	-0.1080E-04	-0.1347E-04	-0.1614E-04
ELEMENT 10	-0.1614E-04	-0.1882E-04	-0.2150E-04
ELEMENT 11	-0.2150E-04	-0.2418E-04	-0.2686E-04
ELEMENT 12	-0.2686E-04	-0.2955E-04	-0.3224E-04
ELEMENT 13	-0.3224E-04	-0.3494E-04	-0.3763E-04
ELEMENT 14	-0.3763E-04	-0.4034E-04	-0.4304E-04
ELEMENT 15	-0.4304E-04	-0.4575E-04	-0.4846E-04
ELEMENT 16	-0.4846E-04	-0.5117E-04	-0.5389E-04
ELEMENT 17	-0.5389E-04	-0.5661E-04	-0.5933E-04
ELEMENT 18	-0.5933E-04	-0.6206E-04	-0.6479E-04
ELEMENT 19	-0.6479E-04	-0.6752E-04	-0.7026E-04
ELEMENT 20	-0.7026E-04	-0.7300E-04	-0.7574E-04
ELEMENT 21	-0.7574E-04	-0.7849E-04	-0.8124E-04
ELEMENT 22	-0.8124E-04	-0.8399E-04	-0.8674E-04
ELEMENT 23	-0.8674E-04	-0.8950E-04	-0.9227E-04
ELEMENT 24	-0.9227E-04	-0.9503E-04	-0.9780E-04
ELEMENT 25	-0.9780E-04	-0.1006E-03	-0.1033E-03
ELEMENT 26	-0.1033E-03	-0.1061E-03	-0.1089E-03
ELEMENT 27	-0.1089E-03	-0.1117E-03	-0.1145E-03

ELEMENT 28	-0.1145E-03	-0.1173E-03	-0.1201E-03
ELEMENT 29	-0.1201E-03	-0.1229E-03	-0.1257E-03
ELEMENT 30	-0.1257E-03	-0.1285E-03	-0.1313E-03
ELEMENT 31	-0.1313E-03	-0.1341E-03	-0.1369E-03
ELEMENT 32	-0.1369E-03	-0.1397E-03	-0.1425E-03
ELEMENT 33	-0.1425E-03	-0.1454E-03	-0.1482E-03
ELEMENT 34	-0.1482E-03	-0.1510E-03	-0.1539E-03
ELEMENT 35	-0.1539E-03	-0.1567E-03	-0.1595E-03
ELEMENT 36	-0.1595E-03	-0.1624E-03	-0.1652E-03
ELEMENT 37	-0.1652E-03	-0.1639E-03	-0.1626E-03
ELEMENT 38	-0.1626E-03	-0.1613E-03	-0.1599E-03
ELEMENT 39	-0.1599E-03	-0.1586E-03	-0.1573E-03
ELEMENT 40	-0.1573E-03	-0.1560E-03	-0.1546E-03
ELEMENT 41	-0.1546E-03	-0.1533E-03	-0.1520E-03
ELEMENT 42	-0.1520E-03	-0.1507E-03	-0.1494E-03
ELEMENT 43	-0.1494E-03	-0.1481E-03	-0.1467E-03
ELEMENT 44	-0.1467E-03	-0.1454E-03	-0.1441E-03
ELEMENT 45	-0.1441E-03	-0.1428E-03	-0.1415E-03
ELEMENT 46	-0.1415E-03	-0.1402E-03	-0.1389E-03
ELEMENT 47	-0.1389E-03	-0.1376E-03	-0.1362E-03
ELEMENT 48	-0.1362E-03	-0.1349E-03	-0.1336E-03
ELEMENT 49	-0.1336E-03	-0.1323E-03	-0.1310E-03
ELEMENT 50	-0.1310E-03	-0.1297E-03	-0.1284E-03
ELEMENT 51	-0.1284E-03	-0.1283E-03	-0.1282E-03
ELEMENT 52	-0.1282E-03	-0.1281E-03	-0.1280E-03
ELEMENT 53	-0.1280E-03	-0.1279E-03	-0.1278E-03
ELEMENT 54	-0.1278E-03	-0.1278E-03	-0.1277E-03
ELEMENT 55	-0.1277E-03	-0.1276E-03	-0.1275E-03
ELEMENT 56	-0.1275E-03	-0.1274E-03	-0.1274E-03
ELEMENT 57	-0.1274E-03	-0.1273E-03	-0.1272E-03
ELEMENT 58	-0.1272E-03	-0.1272E-03	-0.1271E-03
ELEMENT 59	-0.1271E-03	-0.1270E-03	-0.1270E-03
ELEMENT 60	-0.1270E-03	-0.1269E-03	-0.1269E-03
ELEMENT 61	-0.1269E-03	-0.1268E-03	-0.1268E-03
ELEMENT 62	-0.1268E-03	-0.1267E-03	-0.1267E-03
ELEMENT 63	-0.1267E-03	-0.1266E-03	-0.1266E-03
ELEMENT 64	-0.1266E-03	-0.1265E-03	-0.1265E-03
ELEMENT 65	-0.1265E-03	-0.1265E-03	-0.1264E-03
ELEMENT 66	-0.1264E-03	-0.1264E-03	-0.1264E-03
ELEMENT 67	-0.1264E-03	-0.1264E-03	-0.1263E-03
ELEMENT 68	-0.1263E-03	-0.1263E-03	-0.1263E-03
ELEMENT 69	-0.1263E-03	-0.1263E-03	-0.1263E-03
ELEMENT 70	-0.1263E-03	-0.1263E-03	-0.1262E-03
ELEMENT 71	-0.1262E-03	-0.1262E-03	-0.1262E-03
ELEMENT 72	-0.1262E-03	-0.1262E-03	-0.1262E-03
ELEMENT 73	-0.1262E-03	-0.1262E-03	-0.1262E-03
ELEMENT 74	-0.1262E-03	-0.1262E-03	-0.1262E-03
ELEMENT 75	-0.1262E-03	-0.1263E-03	-0.1263E-03
ELEMENT 76	-0.1263E-03	-0.1263E-03	-0.1263E-03
ELEMENT 77	-0.1263E-03	-0.1263E-03	-0.1263E-03
ELEMENT 78	-0.1263E-03	-0.1264E-03	-0.1264E-03
ELEMENT 79	-0.1264E-03	-0.1264E-03	-0.1264E-03
ELEMENT 80	-0.1264E-03	-0.1265E-03	-0.1265E-03
ELEMENT 81	-0.1265E-03	-0.1265E-03	-0.1266E-03
ELEMENT 82	-0.1266E-03	-0.1266E-03	-0.1267E-03
ELEMENT 83	-0.1267E-03	-0.1267E-03	-0.1268E-03
ELEMENT 84	-0.1268E-03	-0.1268E-03	-0.1269E-03
ELEMENT 85	-0.1269E-03	-0.1269E-03	-0.1270E-03
ELEMENT 86	-0.1270E-03	-0.1270E-03	-0.1271E-03
ELEMENT 87	-0.1271E-03	-0.1272E-03	-0.1272E-03
ELEMENT 88	-0.1272E-03	-0.1273E-03	-0.1274E-03
ELEMENT 89	-0.1274E-03	-0.1274E-03	-0.1275E-03
ELEMENT 90	-0.1275E-03	-0.1276E-03	-0.1277E-03
ELEMENT 91	-0.1277E-03	-0.1278E-03	-0.1278E-03
ELEMENT 92	-0.1278E-03	-0.1279E-03	-0.1280E-03
ELEMENT 93	-0.1280E-03	-0.1281E-03	-0.1282E-03

ELEMENT 94	-0.1282E-03	-0.1283E-03	-0.1284E-03
ELEMENT 95	-0.1284E-03	-0.1297E-03	-0.1310E-03
ELEMENT 96	-0.1310E-03	-0.1323E-03	-0.1336E-03
ELEMENT 97	-0.1336E-03	-0.1349E-03	-0.1362E-03
ELEMENT 98	-0.1362E-03	-0.1376E-03	-0.1389E-03
ELEMENT 99	-0.1389E-03	-0.1402E-03	-0.1415E-03
ELEMENT100	-0.1415E-03	-0.1428E-03	-0.1441E-03
ELEMENT101	-0.1441E-03	-0.1454E-03	-0.1467E-03
ELEMENT102	-0.1467E-03	-0.1481E-03	-0.1494E-03
ELEMENT103	-0.1494E-03	-0.1507E-03	-0.1520E-03
ELEMENT104	-0.1520E-03	-0.1533E-03	-0.1546E-03
ELEMENT105	-0.1546E-03	-0.1560E-03	-0.1573E-03
ELEMENT106	-0.1573E-03	-0.1586E-03	-0.1599E-03
ELEMENT107	-0.1599E-03	-0.1613E-03	-0.1626E-03
ELEMENT108	-0.1626E-03	-0.1639E-03	-0.1652E-03
ELEMENT109	-0.1652E-03	-0.1624E-03	-0.1595E-03
ELEMENT110	-0.1595E-03	-0.1567E-03	-0.1539E-03
ELEMENT111	-0.1539E-03	-0.1510E-03	-0.1482E-03
ELEMENT112	-0.1482E-03	-0.1454E-03	-0.1425E-03
ELEMENT113	-0.1425E-03	-0.1397E-03	-0.1369E-03
ELEMENT114	-0.1369E-03	-0.1341E-03	-0.1313E-03
ELEMENT115	-0.1313E-03	-0.1285E-03	-0.1257E-03
ELEMENT116	-0.1257E-03	-0.1229E-03	-0.1201E-03
ELEMENT117	-0.1201E-03	-0.1173E-03	-0.1145E-03
ELEMENT118	-0.1145E-03	-0.1117E-03	-0.1089E-03
ELEMENT119	-0.1089E-03	-0.1061E-03	-0.1033E-03
ELEMENT120	-0.1033E-03	-0.1006E-03	-0.9780E-04
ELEMENT121	-0.9780E-04	-0.9503E-04	-0.9227E-04
ELEMENT122	-0.9227E-04	-0.8950E-04	-0.8674E-04
ELEMENT123	-0.8674E-04	-0.8399E-04	-0.8124E-04
ELEMENT124	-0.8124E-04	-0.7849E-04	-0.7574E-04
ELEMENT125	-0.7574E-04	-0.7300E-04	-0.7026E-04
ELEMENT126	-0.7026E-04	-0.6752E-04	-0.6479E-04
ELEMENT127	-0.6479E-04	-0.6206E-04	-0.5933E-04
ELEMENT128	-0.5933E-04	-0.5661E-04	-0.5389E-04
ELEMENT129	-0.5389E-04	-0.5117E-04	-0.4846E-04
ELEMENT130	-0.4846E-04	-0.4575E-04	-0.4304E-04
ELEMENT131	-0.4304E-04	-0.4034E-04	-0.3763E-04
ELEMENT132	-0.3763E-04	-0.3494E-04	-0.3224E-04
ELEMENT133	-0.3224E-04	-0.2955E-04	-0.2686E-04
ELEMENT134	-0.2686E-04	-0.2418E-04	-0.2150E-04
ELEMENT135	-0.2150E-04	-0.1882E-04	-0.1614E-04
ELEMENT136	-0.1614E-04	-0.1347E-04	-0.1080E-04
ELEMENT137	-0.1080E-04	-0.8139E-05	-0.5475E-05
ELEMENT138	-0.5475E-05	-0.2818E-05	-0.1608E-06
ELEMENT139	-0.1611E-06	-0.1364E-06	-0.1116E-06
ELEMENT140	-0.1116E-06	-0.9141E-07	-0.7118E-07
ELEMENT141	-0.7118E-07	-0.5544E-07	-0.3971E-07
ELEMENT142	-0.3971E-07	-0.2847E-07	-0.1723E-07
ELEMENT143	-0.1723E-07	-0.1049E-07	-0.3746E-08
ELEMENT144	-0.3746E-08	-0.1499E-08	0.7493E-09

ELEMENT BENDING STRESS	LEFT	CENTER	RIGHT
ELEMENT 1	0.2248E-01	-0.4496E-01	-0.1124E+00
ELEMENT 2	-0.1124E+00	-0.3147E+00	-0.5170E+00
ELEMENT 3	-0.5170E+00	-0.8541E+00	-0.1191E+01
ELEMENT 4	-0.1191E+01	-0.1663E+01	-0.2135E+01
ELEMENT 5	-0.2135E+01	-0.2742E+01	-0.3349E+01
ELEMENT 6	-0.3349E+01	-0.4091E+01	-0.4833E+01
ELEMENT 7	-0.4823E+01	-0.8454E+02	-0.1643E+03
ELEMENT 8	-0.1643E+03	-0.2442E+03	-0.3241E+03
ELEMENT 9	-0.3241E+03	-0.4042E+03	-0.4843E+03
ELEMENT 10	-0.4843E+03	-0.5646E+03	-0.6449E+03
ELEMENT 11	-0.6449E+03	-0.7254E+03	-0.8059E+03

ELEMENT 12	-0.8059E+03	-0.8865E+03	-0.9672E+03
ELEMENT 13	-0.9672E+03	-0.1048E+04	-0.1129E+04
ELEMENT 14	-0.1129E+04	-0.1210E+04	-0.1291E+04
ELEMENT 15	-0.1291E+04	-0.1372E+04	-0.1454E+04
ELEMENT 16	-0.1454E+04	-0.1535E+04	-0.1617E+04
ELEMENT 17	-0.1617E+04	-0.1698E+04	-0.1780E+04
ELEMENT 18	-0.1780E+04	-0.1862E+04	-0.1944E+04
ELEMENT 19	-0.1944E+04	-0.2026E+04	-0.2108E+04
ELEMENT 20	-0.2108E+04	-0.2190E+04	-0.2272E+04
ELEMENT 21	-0.2272E+04	-0.2355E+04	-0.2437E+04
ELEMENT 22	-0.2437E+04	-0.2520E+04	-0.2602E+04
ELEMENT 23	-0.2602E+04	-0.2685E+04	-0.2768E+04
ELEMENT 24	-0.2768E+04	-0.2851E+04	-0.2934E+04
ELEMENT 25	-0.2934E+04	-0.3017E+04	-0.3100E+04
ELEMENT 26	-0.3100E+04	-0.3184E+04	-0.3267E+04
ELEMENT 27	-0.3267E+04	-0.3351E+04	-0.3434E+04
ELEMENT 28	-0.3434E+04	-0.3518E+04	-0.3602E+04
ELEMENT 29	-0.3602E+04	-0.3686E+04	-0.3770E+04
ELEMENT 30	-0.3770E+04	-0.3854E+04	-0.3938E+04
ELEMENT 31	-0.3938E+04	-0.4023E+04	-0.4107E+04
ELEMENT 32	-0.4107E+04	-0.4192E+04	-0.4276E+04
ELEMENT 33	-0.4276E+04	-0.4361E+04	-0.4446E+04
ELEMENT 34	-0.4446E+04	-0.4531E+04	-0.4616E+04
ELEMENT 35	-0.4616E+04	-0.4701E+04	-0.4786E+04
ELEMENT 36	-0.4786E+04	-0.4871E+04	-0.4957E+04 ← $\sigma_{b\,max}$
ELEMENT 37	-0.4957E+04	-0.4917E+04	-0.4877E+04
ELEMENT 38	-0.4877E+04	-0.4838E+04	-0.4798E+04
ELEMENT 39	-0.4798E+04	-0.4758E+04	-0.4719E+04
ELEMENT 40	-0.4719E+04	-0.4679E+04	-0.4639E+04
ELEMENT 41	-0.4639E+04	-0.4600E+04	-0.4560E+04
ELEMENT 42	-0.4560E+04	-0.4521E+04	-0.4481E+04
ELEMENT 43	-0.4481E+04	-0.4442E+04	-0.4402E+04
ELEMENT 44	-0.4402E+04	-0.4363E+04	-0.4323E+04
ELEMENT 45	-0.4323E+04	-0.4284E+04	-0.4245E+04
ELEMENT 46	-0.4245E+04	-0.4205E+04	-0.4166E+04
ELEMENT 47	-0.4166E+04	-0.4127E+04	-0.4087E+04
ELEMENT 48	-0.4087E+04	-0.4048E+04	-0.4009E+04
ELEMENT 49	-0.4009E+04	-0.3970E+04	-0.3930E+04
ELEMENT 50	-0.3930E+04	-0.3891E+04	-0.3852E+04
ELEMENT 51	-0.3852E+04	-0.3849E+04	-0.3846E+04
ELEMENT 52	-0.3846E+04	-0.3843E+04	-0.3841E+04
ELEMENT 53	-0.3841E+04	-0.3838E+04	-0.3835E+04
ELEMENT 54	-0.3835E+04	-0.3833E+04	-0.3830E+04
ELEMENT 55	-0.3830E+04	-0.3828E+04	-0.3826E+04
ELEMENT 56	-0.3826E+04	-0.3823E+04	-0.3821E+04
ELEMENT 57	-0.3821E+04	-0.3819E+04	-0.3817E+04
ELEMENT 58	-0.3817E+04	-0.3815E+04	-0.3813E+04
ELEMENT 59	-0.3813E+04	-0.3811E+04	-0.3810E+04
ELEMENT 60	-0.3810E+04	-0.3808E+04	-0.3806E+04
ELEMENT 61	-0.3806E+04	-0.3805E+04	-0.3803E+04
ELEMENT 62	-0.3803E+04	-0.3802E+04	-0.3800E+04
ELEMENT 63	-0.3800E+04	-0.3799E+04	-0.3798E+04
ELEMENT 64	-0.3798E+04	-0.3796E+04	-0.3795E+04
ELEMENT 65	-0.3795E+04	-0.3794E+04	-0.3793E+04
ELEMENT 66	-0.3793E+04	-0.3792E+04	-0.3792E+04
ELEMENT 67	-0.3792E+04	-0.3791E+04	-0.3790E+04
ELEMENT 68	-0.3790E+04	-0.3789E+04	-0.3789E+04
ELEMENT 69	-0.3789E+04	-0.3788E+04	-0.3788E+04
ELEMENT 70	-0.3788E+04	-0.3788E+04	-0.3787E+04
ELEMENT 71	-0.3787E+04	-0.3787E+04	-0.3787E+04
ELEMENT 72	-0.3787E+04	-0.3787E+04	-0.3787E+04
ELEMENT 73	-0.3787E+04	-0.3787E+04	-0.3787E+04
ELEMENT 74	-0.3787E+04	-0.3787E+04	-0.3787E+04
ELEMENT 75	-0.3787E+04	-0.3788E+04	-0.3788E+04
ELEMENT 76	-0.3788E+04	-0.3788E+04	-0.3789E+04
ELEMENT 77	-0.3789E+04	-0.3789E+04	-0.3790E+04

ELEMENT 78	-0.3790E+04	-0.3791E+04	-0.3792E+04
ELEMENT 79	-0.3792E+04	-0.3792E+04	-0.3793E+04
ELEMENT 80	-0.3793E+04	-0.3794E+04	-0.3795E+04
ELEMENT 81	-0.3795E+04	-0.3796E+04	-0.3798E+04
ELEMENT 82	-0.3798E+04	-0.3799E+04	-0.3800E+04
ELEMENT 83	-0.3800E+04	-0.3802E+04	-0.3803E+04
ELEMENT 84	-0.3803E+04	-0.3805E+04	-0.3806E+04
ELEMENT 85	-0.3806E+04	-0.3808E+04	-0.3810E+04
ELEMENT 86	-0.3810E+04	-0.3811E+04	-0.3813E+04
ELEMENT 87	-0.3813E+04	-0.3815E+04	-0.3817E+04
ELEMENT 88	-0.3817E+04	-0.3819E+04	-0.3821E+04
ELEMENT 89	-0.3821E+04	-0.3823E+04	-0.3826E+04
ELEMENT 90	-0.3826E+04	-0.3828E+04	-0.3830E+04
ELEMENT 91	-0.3830E+04	-0.3833E+04	-0.3835E+04
ELEMENT 92	-0.3835E+04	-0.3838E+04	-0.3841E+04
ELEMENT 93	-0.3841E+04	-0.3843E+04	-0.3846E+04
ELEMENT 94	-0.3846E+04	-0.3849E+04	-0.3852E+04
ELEMENT 95	-0.3852E+04	-0.3891E+04	-0.3930E+04
ELEMENT 96	-0.3930E+04	-0.3970E+04	-0.4009E+04
ELEMENT 97	-0.4009E+04	-0.4048E+04	-0.4087E+04
ELEMENT 98	-0.4087E+04	-0.4127E+04	-0.4166E+04
ELEMENT 99	-0.4166E+04	-0.4205E+04	-0.4245E+04
ELEMENT100	-0.4245E+04	-0.4284E+04	-0.4323E+04
ELEMENT101	-0.4323E+04	-0.4363E+04	-0.4402E+04
ELEMENT102	-0.4402E+04	-0.4442E+04	-0.4481E+04
ELEMENT103	-0.4481E+04	-0.4521E+04	-0.4560E+04
ELEMENT104	-0.4560E+04	-0.4600E+04	-0.4639E+04
ELEMENT105	-0.4639E+04	-0.4679E+04	-0.4719E+04
ELEMENT106	-0.4719E+04	-0.4758E+04	-0.4798E+04
ELEMENT107	-0.4798E+04	-0.4838E+04	-0.4877E+04
ELEMENT108	-0.4877E+04	-0.4917E+04	-0.4957E+04
ELEMENT109	-0.4957E+04	-0.4871E+04	-0.4786E+04
ELEMENT110	-0.4786E+04	-0.4701E+04	-0.4616E+04
ELEMENT111	-0.4616E+04	-0.4531E+04	-0.4446E+04
ELEMENT112	-0.4446E+04	-0.4361E+04	-0.4276E+04
ELEMENT113	-0.4276E+04	-0.4192E+04	-0.4107E+04
ELEMENT114	-0.4107E+04	-0.4023E+04	-0.3938E+04
ELEMENT115	-0.3938E+04	-0.3854E+04	-0.3770E+04
ELEMENT116	-0.3770E+04	-0.3686E+04	-0.3602E+04
ELEMENT117	-0.3602E+04	-0.3518E+04	-0.3434E+04
ELEMENT118	-0.3434E+04	-0.3351E+04	-0.3267E+04
ELEMENT119	-0.3267E+04	-0.3184E+04	-0.3100E+04
ELEMENT120	-0.3100E+04	-0.3017E+04	-0.2934E+04
ELEMENT121	-0.2934E+04	-0.2851E+04	-0.2768E+04
ELEMENT122	-0.2768E+04	-0.2685E+04	-0.2602E+04
ELEMENT123	-0.2602E+04	-0.2520E+04	-0.2437E+04
ELEMENT124	-0.2437E+04	-0.2355E+04	-0.2272E+04
ELEMENT125	-0.2272E+04	-0.2190E+04	-0.2108E+04
ELEMENT126	-0.2108E+04	-0.2026E+04	-0.1944E+04
ELEMENT127	-0.1944E+04	-0.1862E+04	-0.1780E+04
ELEMENT128	-0.1780E+04	-0.1698E+04	-0.1617E+04
ELEMENT129	-0.1617E+04	-0.1535E+04	-0.1454E+04
ELEMENT130	-0.1454E+04	-0.1372E+04	-0.1291E+04
ELEMENT131	-0.1291E+04	-0.1210E+04	-0.1129E+04
ELEMENT132	-0.1129E+04	-0.1048E+04	-0.9672E+03
ELEMENT133	-0.9672E+03	-0.8865E+03	-0.8059E+03
ELEMENT134	-0.8059E+03	-0.7254E+03	-0.6449E+03
ELEMENT135	-0.6449E+03	-0.5646E+03	-0.4843E+03
ELEMENT136	-0.4843E+03	-0.4042E+03	-0.3241E+03
ELEMENT137	-0.3241E+03	-0.2442E+03	-0.1643E+03
ELEMENT138	-0.1643E+03	-0.8454E+02	-0.4823E+01
ELEMENT139	-0.4833E+01	-0.4091E+01	-0.3349E+01
ELEMENT140	-0.3349E+01	-0.2742E+01	-0.2135E+01
ELEMENT141	-0.2135E+01	-0.1663E+01	-0.1191E+01
ELEMENT142	-0.1191E+01	-0.8541E+00	-0.5170E+00
ELEMENT143	-0.5170E+00	-0.3147E+00	-0.1124E+00

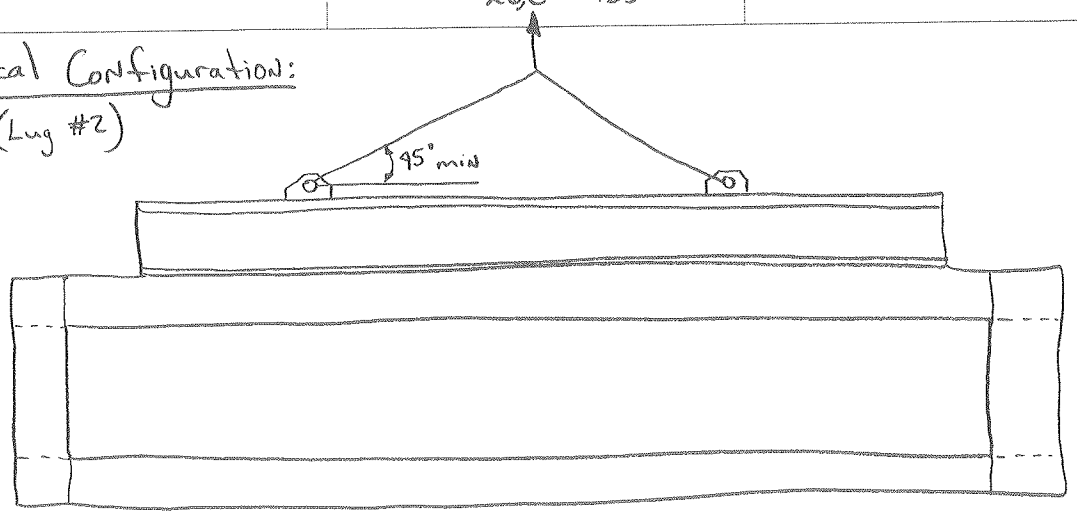
ELEMENT144	-0.1124E+00	-0.4496E-01	0.2248E-01

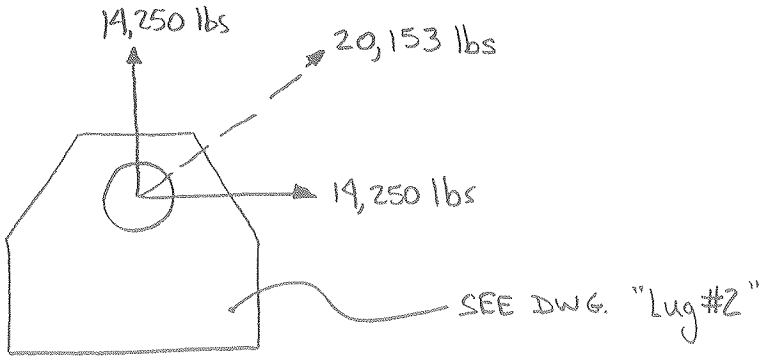
ELEMENT SHEAR STRESS	LEFT	CENTER	RIGHT
ELEMENT 1	0.3426E-07	0.3472E+00	0.6945E+00
ELEMENT 2	0.6945E+00	0.1042E+01	0.1389E+01
ELEMENT 3	0.1389E+01	0.1736E+01	0.2084E+01
ELEMENT 4	0.2084E+01	0.2431E+01	0.2778E+01
ELEMENT 5	0.2778E+01	0.3125E+01	0.3473E+01
ELEMENT 6	0.3473E+01	0.3820E+01	0.4167E+01
ELEMENT 7	0.3417E+03	0.3421E+03	0.3425E+03
ELEMENT 8	0.3425E+03	0.3429E+03	0.3433E+03
ELEMENT 9	0.3433E+03	0.3438E+03	0.3442E+03
ELEMENT 10	0.3442E+03	0.3446E+03	0.3450E+03
ELEMENT 11	0.3450E+03	0.3454E+03	0.3458E+03
ELEMENT 12	0.3458E+03	0.3463E+03	0.3467E+03
ELEMENT 13	0.3467E+03	0.3471E+03	0.3475E+03
ELEMENT 14	0.3475E+03	0.3479E+03	0.3483E+03
ELEMENT 15	0.3483E+03	0.3488E+03	0.3492E+03
ELEMENT 16	0.3492E+03	0.3496E+03	0.3500E+03
ELEMENT 17	0.3500E+03	0.3504E+03	0.3508E+03
ELEMENT 18	0.3508E+03	0.3513E+03	0.3517E+03
ELEMENT 19	0.3517E+03	0.3521E+03	0.3525E+03
ELEMENT 20	0.3525E+03	0.3529E+03	0.3533E+03
ELEMENT 21	0.3533E+03	0.3538E+03	0.3542E+03
ELEMENT 22	0.3542E+03	0.3546E+03	0.3550E+03
ELEMENT 23	0.3550E+03	0.3554E+03	0.3558E+03
ELEMENT 24	0.3558E+03	0.3563E+03	0.3567E+03
ELEMENT 25	0.3567E+03	0.3571E+03	0.3575E+03
ELEMENT 26	0.3575E+03	0.3579E+03	0.3583E+03
ELEMENT 27	0.3583E+03	0.3588E+03	0.3592E+03
ELEMENT 28	0.3592E+03	0.3596E+03	0.3600E+03
ELEMENT 29	0.3600E+03	0.3604E+03	0.3608E+03
ELEMENT 30	0.3608E+03	0.3613E+03	0.3617E+03
ELEMENT 31	0.3617E+03	0.3621E+03	0.3625E+03
ELEMENT 32	0.3625E+03	0.3629E+03	0.3633E+03
ELEMENT 33	0.3633E+03	0.3638E+03	0.3642E+03
ELEMENT 34	0.3642E+03	0.3646E+03	0.3650E+03
ELEMENT 35	0.3650E+03	0.3654E+03	0.3658E+03
ELEMENT 36	0.3658E+03	0.3663E+03	0.3667E+03 ← τ_{max}
ELEMENT 37	0.3583E+03	0.3581E+03	0.3579E+03
ELEMENT 38	0.3579E+03	0.3577E+03	0.3575E+03
ELEMENT 39	0.3575E+03	0.3573E+03	0.3571E+03
ELEMENT 40	0.3571E+03	0.3569E+03	0.3567E+03
ELEMENT 41	0.3567E+03	0.3565E+03	0.3564E+03
ELEMENT 42	0.3564E+03	0.3562E+03	0.3560E+03
ELEMENT 43	0.3560E+03	0.3558E+03	0.3556E+03
ELEMENT 44	0.3556E+03	0.3554E+03	0.3552E+03
ELEMENT 45	0.3552E+03	0.3550E+03	0.3548E+03
ELEMENT 46	0.3548E+03	0.3546E+03	0.3544E+03
ELEMENT 47	0.3544E+03	0.3542E+03	0.3540E+03
ELEMENT 48	0.3540E+03	0.3538E+03	0.3536E+03
ELEMENT 49	0.3536E+03	0.3534E+03	0.3532E+03
ELEMENT 50	0.3532E+03	0.3530E+03	0.3528E+03
ELEMENT 51	0.1528E+02	0.1493E+02	0.1458E+02
ELEMENT 52	0.1458E+02	0.1424E+02	0.1389E+02
ELEMENT 53	0.1389E+02	0.1354E+02	0.1320E+02
ELEMENT 54	0.1320E+02	0.1285E+02	0.1250E+02
ELEMENT 55	0.1250E+02	0.1215E+02	0.1181E+02
ELEMENT 56	0.1181E+02	0.1146E+02	0.1111E+02
ELEMENT 57	0.1111E+02	0.1076E+02	0.1042E+02
ELEMENT 58	0.1042E+02	0.1007E+02	0.9723E+01
ELEMENT 59	0.9723E+01	0.9376E+01	0.9028E+01
ELEMENT 60	0.9028E+01	0.8681E+01	0.8334E+01
ELEMENT 61	0.8334E+01	0.7987E+01	0.7639E+01

ELEMENT 62	0.7639E+01	0.7292E+01	0.6945E+01
ELEMENT 63	0.6945E+01	0.6598E+01	0.6250E+01
ELEMENT 64	0.6250E+01	0.5903E+01	0.5556E+01
ELEMENT 65	0.5556E+01	0.5209E+01	0.4861E+01
ELEMENT 66	0.4861E+01	0.4514E+01	0.4167E+01
ELEMENT 67	0.4167E+01	0.3820E+01	0.3472E+01
ELEMENT 68	0.3472E+01	0.3125E+01	0.2778E+01
ELEMENT 69	0.2778E+01	0.2431E+01	0.2083E+01
ELEMENT 70	0.2083E+01	0.1736E+01	0.1389E+01
ELEMENT 71	0.1389E+01	0.1042E+01	0.6945E+00
ELEMENT 72	0.6945E+00	0.3472E+00	0.2312E-07
ELEMENT 73	0.3397E-07	0.3473E+00	0.6945E+00
ELEMENT 74	0.6945E+00	0.1042E+01	0.1389E+01
ELEMENT 75	0.1389E+01	0.1736E+01	0.2084E+01
ELEMENT 76	0.2084E+01	0.2431E+01	0.2778E+01
ELEMENT 77	0.2778E+01	0.3125E+01	0.3473E+01
ELEMENT 78	0.3473E+01	0.3820E+01	0.4167E+01
ELEMENT 79	0.4167E+01	0.4514E+01	0.4862E+01
ELEMENT 80	0.4862E+01	0.5209E+01	0.5556E+01
ELEMENT 81	0.5556E+01	0.5903E+01	0.6251E+01
ELEMENT 82	0.6251E+01	0.6598E+01	0.6945E+01
ELEMENT 83	0.6945E+01	0.7292E+01	0.7640E+01
ELEMENT 84	0.7640E+01	0.7987E+01	0.8334E+01
ELEMENT 85	0.8334E+01	0.8681E+01	0.9029E+01
ELEMENT 86	0.9029E+01	0.9376E+01	0.9723E+01
ELEMENT 87	0.9723E+01	0.1007E+02	0.1042E+02
ELEMENT 88	0.1042E+02	0.1076E+02	0.1111E+02
ELEMENT 89	0.1111E+02	0.1146E+02	0.1181E+02
ELEMENT 90	0.1181E+02	0.1215E+02	0.1250E+02
ELEMENT 91	0.1250E+02	0.1285E+02	0.1320E+02
ELEMENT 92	0.1320E+02	0.1354E+02	0.1389E+02
ELEMENT 93	0.1389E+02	0.1424E+02	0.1458E+02
ELEMENT 94	0.1458E+02	0.1493E+02	0.1528E+02
ELEMENT 95	0.3528E+03	0.3530E+03	0.3532E+03
ELEMENT 96	0.3532E+03	0.3534E+03	0.3536E+03
ELEMENT 97	0.3536E+03	0.3538E+03	0.3540E+03
ELEMENT 98	0.3540E+03	0.3542E+03	0.3544E+03
ELEMENT 99	0.3544E+03	0.3546E+03	0.3548E+03
ELEMENT100	0.3548E+03	0.3550E+03	0.3552E+03
ELEMENT101	0.3552E+03	0.3554E+03	0.3556E+03
ELEMENT102	0.3556E+03	0.3558E+03	0.3560E+03
ELEMENT103	0.3560E+03	0.3562E+03	0.3564E+03
ELEMENT104	0.3564E+03	0.3565E+03	0.3567E+03
ELEMENT105	0.3567E+03	0.3569E+03	0.3571E+03
ELEMENT106	0.3571E+03	0.3573E+03	0.3575E+03
ELEMENT107	0.3575E+03	0.3577E+03	0.3579E+03
ELEMENT108	0.3579E+03	0.3581E+03	0.3583E+03
ELEMENT109	0.3667E+03	0.3663E+03	0.3658E+03
ELEMENT110	0.3658E+03	0.3654E+03	0.3650E+03
ELEMENT111	0.3650E+03	0.3646E+03	0.3642E+03
ELEMENT112	0.3642E+03	0.3638E+03	0.3633E+03
ELEMENT113	0.3633E+03	0.3629E+03	0.3625E+03
ELEMENT114	0.3625E+03	0.3621E+03	0.3617E+03
ELEMENT115	0.3617E+03	0.3613E+03	0.3608E+03
ELEMENT116	0.3608E+03	0.3604E+03	0.3600E+03
ELEMENT117	0.3600E+03	0.3596E+03	0.3592E+03
ELEMENT118	0.3592E+03	0.3588E+03	0.3583E+03
ELEMENT119	0.3583E+03	0.3579E+03	0.3575E+03
ELEMENT120	0.3575E+03	0.3571E+03	0.3567E+03
ELEMENT121	0.3567E+03	0.3563E+03	0.3558E+03
ELEMENT122	0.3558E+03	0.3554E+03	0.3550E+03
ELEMENT123	0.3550E+03	0.3546E+03	0.3542E+03
ELEMENT124	0.3542E+03	0.3538E+03	0.3533E+03
ELEMENT125	0.3533E+03	0.3529E+03	0.3525E+03
ELEMENT126	0.3525E+03	0.3521E+03	0.3517E+03
ELEMENT127	0.3517E+03	0.3513E+03	0.3508E+03

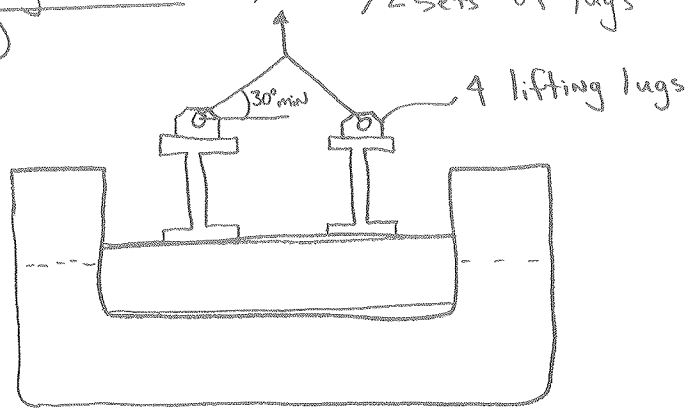
ELEMENT128	0.3508E+03	0.3504E+03	0.3500E+03
ELEMENT129	0.3500E+03	0.3496E+03	0.3492E+03
ELEMENT130	0.3492E+03	0.3488E+03	0.3483E+03
ELEMENT131	0.3483E+03	0.3479E+03	0.3475E+03
ELEMENT132	0.3475E+03	0.3471E+03	0.3467E+03
ELEMENT133	0.3467E+03	0.3463E+03	0.3458E+03
ELEMENT134	0.3458E+03	0.3454E+03	0.3450E+03
ELEMENT135	0.3450E+03	0.3446E+03	0.3442E+03
ELEMENT136	0.3442E+03	0.3438E+03	0.3433E+03
ELEMENT137	0.3433E+03	0.3429E+03	0.3425E+03
ELEMENT138	0.3425E+03	0.3421E+03	0.3417E+03
ELEMENT139	0.4167E+01	0.3820E+01	0.3473E+01
ELEMENT140	0.3473E+01	0.3125E+01	0.2778E+01
ELEMENT141	0.2778E+01	0.2431E+01	0.2084E+01
ELEMENT142	0.2084E+01	0.1736E+01	0.1389E+01
ELEMENT143	0.1389E+01	0.1042E+01	0.6945E+00
ELEMENT144	0.6945E+00	0.3473E+00	0.7302E-09

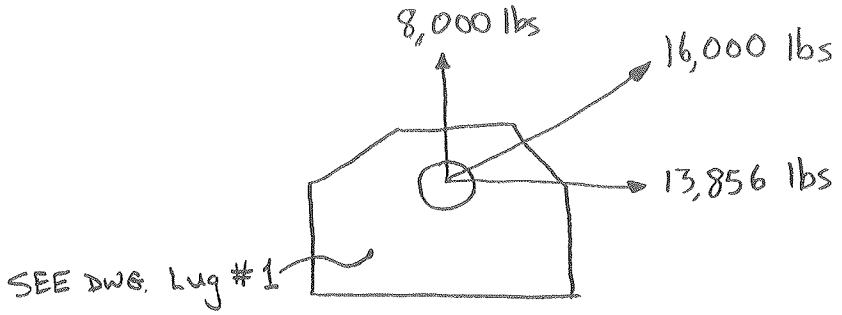
Vertical Configuration:
(Lug #2)





Horizontal Configuration:
(Lug #1)





LIFTING LUG ANALYSIS for LIFTING FIXTURES

BEARING AND SHEAR STRESSES, PIN SHEAR, AND WELD SIZING

LUG #1
used in horizontal lifting configuration

$d = 3.125$ in

$Hole\_diameter = 1.5$ in

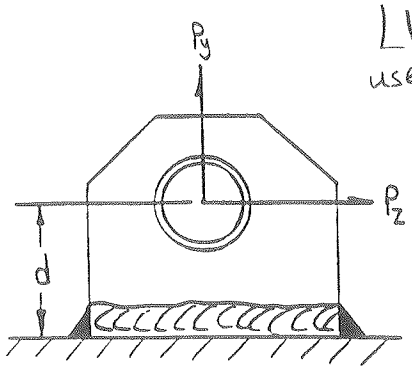
$Pin\_diameter = 1.375$ in

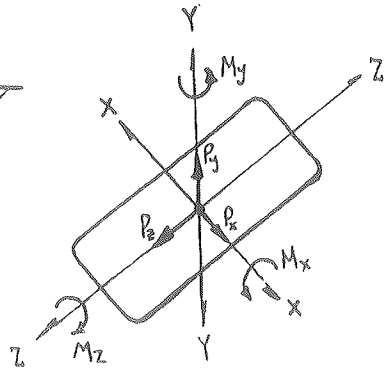
$edge\_distance = 1.875$ in

$minimum\_edge\_distance = 1.875$ in

$lug\_width = 7.50$ in

$lug\_thickness = 1.75$ in





Loads:

$P_x = 800.0$ Lbs $\quad P_y = 8000.0$ Lbs $\quad P_z = 13856.0$ Lbs

Moments:

$M_x = P_z \cdot d \quad M_x = 43300$ in-Lbs

$M_z = P_x \cdot d \quad M_z = 2500$ in-Lbs

Lug Material: 1018 Cold Rolled Steel

Pin Material: Grade 2 or Better

pre-certified shackle for 12 Ton

$F_y = 30000$ psi $\quad F_{all} = \frac{F_y}{3} \quad F_{all} = 10000$ psi $\quad F_u = 58000$ psi

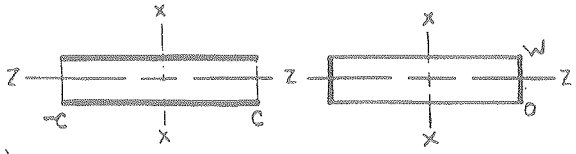
$\tau_{all} = \frac{F_{all}}{2} \quad \tau_{all} = 5000$ psi

Weld Lengths:

$Weld\_length = lug\_width \quad c = \frac{Weld\_length}{2} \quad c = 3.75$ in

$Weld\_width = lug\_thickness \quad w = Weld\_width \quad w = 1.75$ in

Calculate the moment of inertia of the line weld group



$I_{weld} = \int_{-c}^{c} z^2 \, dl$ where dl is assumed to be unity (1" thick)

$I_{x.weld} = 2 \cdot \int_{-c}^{c} z^2 \, dz - 2 \cdot \int_{0}^{w} c^2 \, dx \qquad I_{z.weld} = 2 \cdot \int_{-\frac{w}{2}}^{\frac{w}{2}} x^2 \, dx - 2 \cdot \int_{0}^{2 \cdot c} \left(\frac{w}{2}\right)^2 dz$

$I_{x.weld} = 119.531 \text{ in}^3 \qquad I_{z.weld} = 12.378 \text{ in}^3$

The load on the weld due to bending:

$P_{bx} = \frac{M_x \cdot c}{I_{x.weld}} \quad P_{bx} = 1358.431$ Lbs/in $\qquad P_{bz} = \frac{M_z \cdot \frac{w}{2}}{I_{z.weld}} \quad P_{bz} = 176.73$ Lbs/in

The load on the weld due to shear:

$$total\_weld\_length := 2\cdot(Weld\_length - Weld\_width) \qquad total\_weld\_length = 18.5 \text{ in}$$

$$\tau_x := \frac{P_x}{total\_weld\_length} \qquad \tau_x = 43.243 \text{ lbs/in}$$

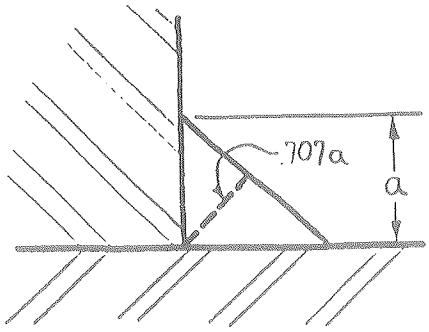
$$\tau_y := \frac{P_y}{total\_weld\_length} \qquad \tau_y = 432.432 \text{ lbs/in}$$

$$\tau_z := \frac{P_z}{total\_weld\_length} \qquad \tau_z = 748.973 \text{ lbs/in}$$

Now, calculate the total vector sum of the weld loads:

$$P_{total} := \sqrt{\tau_x^2 - \tau_y - P_{bx} - P_{bz}^2 - \tau_z^2} \qquad P_{total} = 2105.768 \text{ lbs/in}$$

Size the Fillet Weld based on the total weld load:



$$t_e = .707\cdot a_{min}$$

$$P_{total} = t_e\cdot\tau_{all}$$

$$P_{total} = .707\cdot a_{min}\cdot\tau_{all}$$ The allowable shear is derived from the base material, not the weld material.

$$a_{min} := 1.4144\cdot\frac{P_{total}}{\tau_{all}} \qquad a_{min} = 0.596$$ Round this value up to the nearest 1/8" weld size

$$a_{min} := \frac{ceil(a_{min}\cdot 8)}{8}$$

$a_{min} = 0.625$ in <--- **minimum weld size needed for the given parameters.**

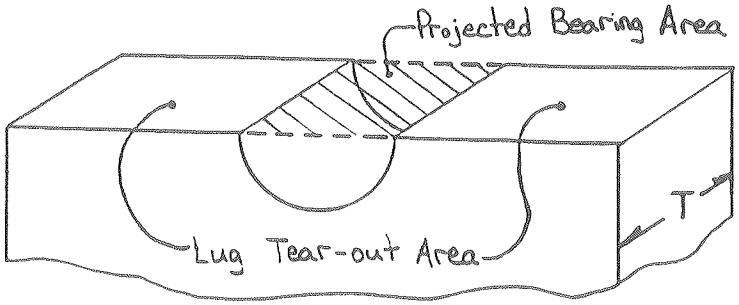
Calculate the Bearing Stress:

The lug thickness was assumed at the beginning of this analysis. The following calculations will determine the required minimum thickness needed for this lug.

$F_y = 30000$ psi

$F_{all} = 10000$ psi

$\tau_{all} = 5000$ psi



$projected\_bearing\_area = Hole\_diameter \cdot T$ (Let "T" be the minimum lug thickness)

Calculate the vector sum of the forces and apply this single load to the lug, through the lifting pin.

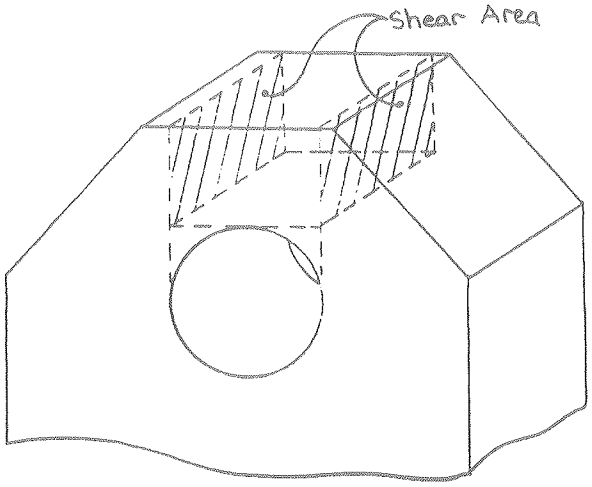
ORIGIN := 1

$Load := \sqrt{P_x^2 + P_y^2 + P_z^2}$ $Load = 16019.636$ Lbs

$F_{all} := \frac{Load}{Hole\_diameter \cdot T}$

$T_1 := \frac{Load}{F_{all} \cdot Hole\_diameter}$ $T_1 = 1.068$ in <--- minimum thickness based on bearing stress

Calculate the Shear Stress:



$edge\_distance = 1.875$ in

$clearance := edge\_distance - \frac{Hole\_diameter}{2}$

$shear\_area := 2 \cdot (clearance \cdot T)$

$\tau_{all} := \frac{Load}{shear\_area} = \frac{1}{2} \cdot \frac{Load}{(clearance \cdot T)}$

$T_2 := \frac{1}{2} \cdot \frac{Load}{\tau_{all} \cdot clearance}$ $T_2 = 1.424$ in <--- minimum thickness based on shear stress

The minimum thickness needed for the lug is determined by considering bearing and shear stresses and choosing the larger of the two minimum lug thicknesses. The minimum weld size is then converted into the nearest 1/8" increment weld size, greater than the actual calculated minimum.

$\max(T) = 1.424$ in $T_{min} := \frac{ceil(\max(T) \cdot 8)}{8}$ $T_{min} = 1.5$ in <--- ***minimum lug thickness***

Shear on Bolt, (Double Shear): (compare the allowable shear stress with the actual shear stress)

$Pin\_diameter = 1.375$ in

$shear\_area = \frac{2 \cdot \pi \cdot Pin\_diameter^2}{4}$ $shear\_area = 2.97$ in²

$Load = 16019.636$ Lbs

$\tau_{bolt} = \frac{Load}{shear\_area}$ $\tau_{bolt} = 5394.204$ psi

$\tau_{allowable\_shear} = .22 \cdot F_u$ $\tau_{allowable\_shear} = 12760$ psi

(The allowable shear stress is calculated from *Guidelines for Structural Bolting in Accordance with the AISC Eighth Edition "Manual of Steel Construction"*, Fermilab TM-1662, May 11, 1990.)

Tear-out on Lug Cross-section: (compare the allowable stress with the actual tear-out stress)

$lug\_width = 7.5$

$lug\_thickness = 1.75$

$Hole\_diameter = 1.5$

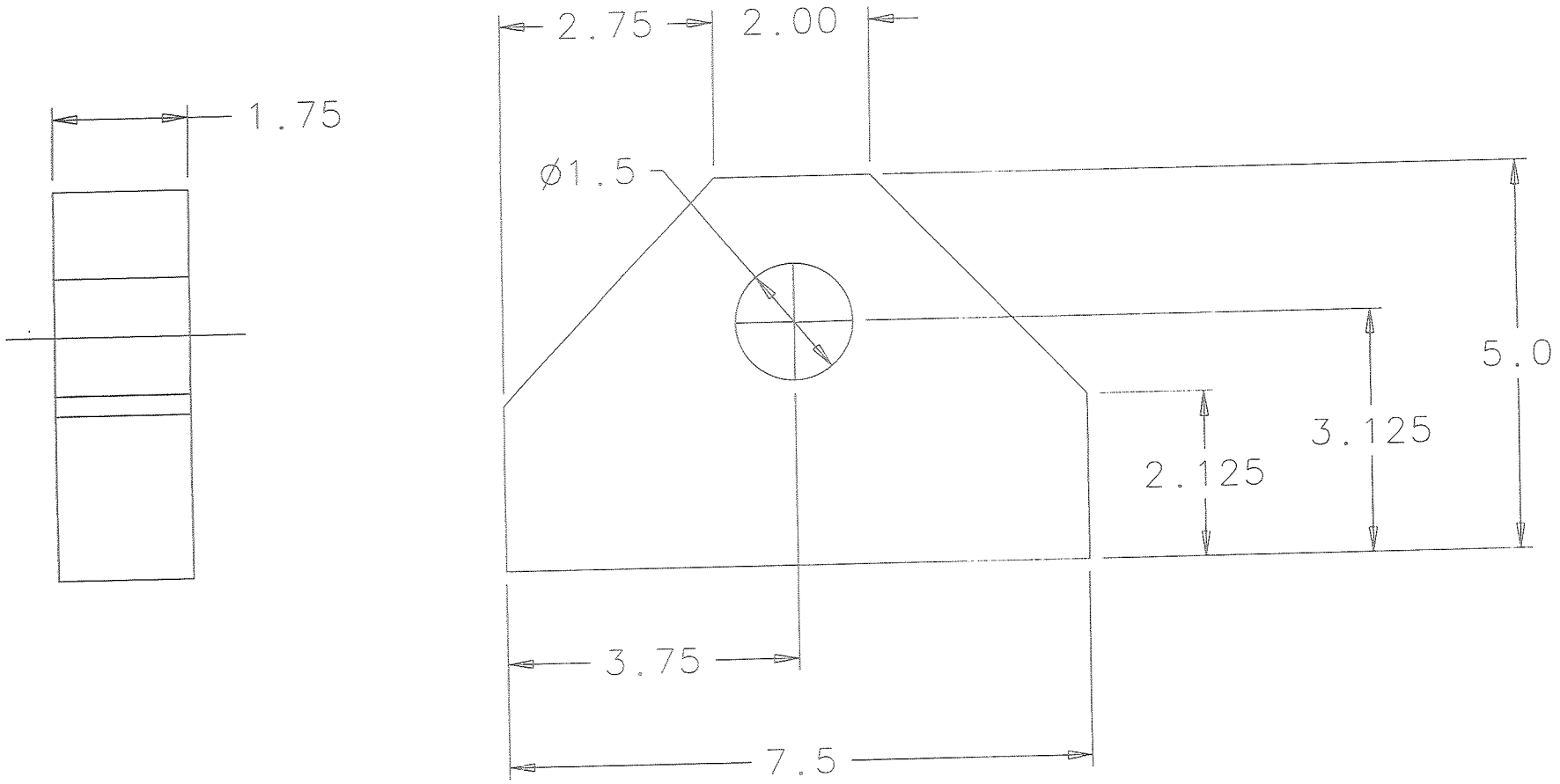
$Area \quad (lug\_width \cdot lug\_thickness) \quad (Hole\_diameter \cdot lug\_thickness)$ $Area = 10.5$ in²

$Load = 16019.636$ Lbs

$Tear\_out = \frac{Load}{Area}$ $Tear\_out = 1525.68$ psi

$F_{all} = 10000$ psi

LIFTING LUG #1



LIFTING LUG ANALYSIS for LIFTING FIXTURES

BEARING AND SHEAR STRESSES, PIN SHEAR, AND WELD SIZING

Lug #2
Used in Vertical lifting Configuration

$d = 2.8125$ in

$Hole\_diameter = 2.125$ in

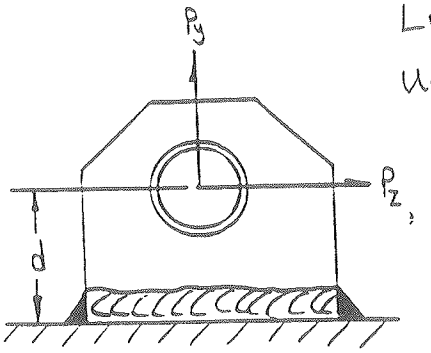
$Pin\_diameter = 2.00$ in

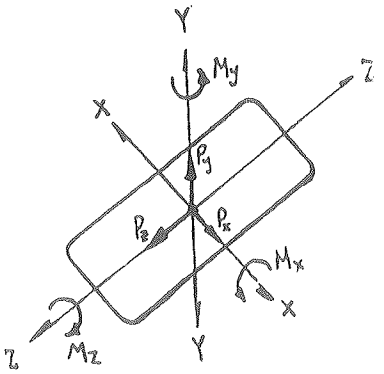
$edge\_distance = 2.1875$ in

$minimum\_edge\_distance = 2.50$ in

$lug\_width = 7.50$ in

$lug\_thickness = 2.0$ in





Loads:

$P_x = 1425.0$ Lbs $\quad P_y = 14250.0$ Lbs $\quad P_z = 14250.0$ Lbs

Moments:

$M_x = P_z \cdot d \quad M_x = 40078.125$ in-Lbs

$M_z \quad P_x \cdot d \quad M_z = 4007.813$ in-Lbs

Lug Material: 1018 Cold Rolled Steel

Pin Material: Grade 2 or Better

pre-certified shackle for 20 Ton

$F_y = 30000$ psi $\quad F_{all} = \frac{F_y}{3} \quad F_{all} = 10000$ psi $\quad F_u = 58000$ psi

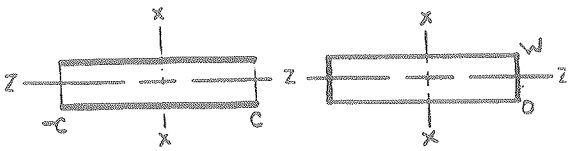
$\tau_{all} = \frac{F_{all}}{2} \quad \tau_{all} = 5000$ psi

Weld Lengths:

$Weld\_length = lug\_width \quad c = \frac{Weld\_length}{2} \quad c = 3.75$ in

$Weld\_width = lug\_thickness \quad w = Weld\_width \quad w = 2$ in

Calculate the moment of inertia of the line weld group



$I_{weld} = \int_a^b z^2 \, dl$ where dl is assumed to be unity (1" thick)

$I_{x.weld} = 2 \cdot \int_{-c}^{c} z^2 \, dz + 2 \cdot \int_0^w c^2 \, dx \qquad I_{z.weld} = 2 \cdot \int_{-\frac{w}{2}}^{\frac{w}{2}} x^2 \, dx + 2 \cdot \int_0^{2 \cdot c} \left(\frac{w}{2}\right)^2 dz$

$I_{x.weld} = 126.563 \text{ in}^3 \qquad I_{z.weld} = 16.333 \text{ in}^3$

The load on the weld due to bending:

$P_{bx} = \frac{M_x \cdot c}{I_{x.weld}} \quad P_{bx} = 1187.5$ Lbs/in $\qquad P_{bz} = \frac{M_z \cdot \frac{w}{2}}{I_{z.weld}} \quad P_{bz} = 245.37$ Lbs/in

The load on the weld due to shear:

$$total\_weld\_length := 2\cdot(Weld\_length + Weld\_width) \qquad total\_weld\_length = 19 \text{ in}$$

$$\tau_x := \frac{P_x}{total\_weld\_length} \qquad \tau_x = 75 \text{ lbs/in}$$

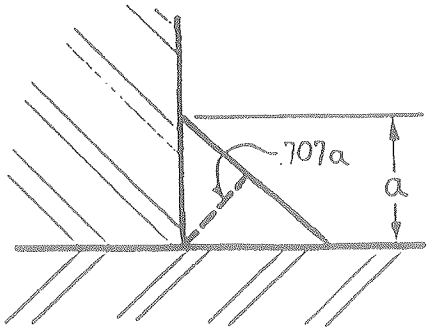
$$\tau_y := \frac{P_y}{total\_weld\_length} \qquad \tau_y = 750 \text{ lbs/in}$$

$$\tau_z := \frac{P_z}{total\_weld\_length} \qquad \tau_z = 750 \text{ lbs/in}$$

Now, calculate the total vector sum of the weld loads:

$$P_{total} := \sqrt{\tau_x^2 + \tau_y + P_{bx} + P_{bz}^2 + \tau_z^2} \qquad P_{total} = 2309.345 \text{ lbs/in}$$

Size the Fillet Weld based on the total weld load:



$$t_e := .707\cdot a_{min}$$

$$P_{total} := t_e\cdot\tau_{all}$$

$$P_{total} := .707\cdot a_{min}\cdot\tau_{all}$$ The allowable shear is derived from the base material, not the weld material.

$$a_{min} := 1.4144\cdot\frac{P_{total}}{\tau_{all}} \qquad a_{min} = 0.653$$ Round this value up to the nearest 1/8" weld size

$$a_{min} := \frac{ceil(a_{min}\cdot 8)}{8}$$

$$a_{min} = 0.75 \text{ in}$$ **<--- minimum weld size needed for the given parameters.**

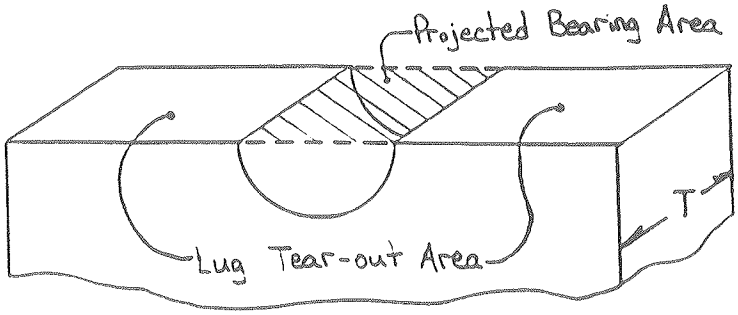
Calculate the Bearing Stress:

The lug thickness was assumed at the beginning of this analysis. The following calculations will determine the required minimum thickness needed for this lug.

$F_y = 30000$ psi

$F_{all} = 10000$ psi

$\tau_{all} = 5000$ psi



$projected\_bearing\_area = Hole\_diameter \cdot T$ (Let "T" be the minimum lug thickness)

Calculate the vector sum of the forces and apply this single load to the lug, through the lifting pin.

ORIGIN 1

$Load = \sqrt{P_x^2 + P_y^2 + P_z^2}$ $Load = 20202.862$ Lbs

$F_{all} = \frac{Load}{Hole\_diameter \cdot T}$

$T_1 = \frac{Load}{F_{all} \cdot Hole\_diameter}$ $T_1 = 0.951$ in <--- minimum thickness based on bearing stress

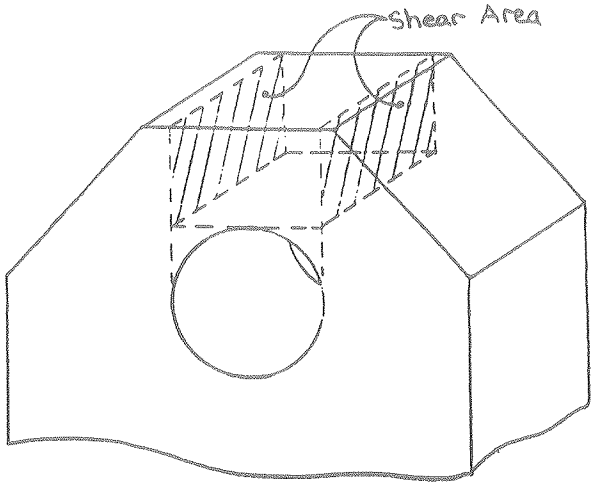
Calculate the Shear Stress:

$edge\_distance = 2.188$ in

$clearance = edge\_distance - \frac{Hole\_diameter}{2}$

$shear\_area = 2 \cdot (clearance \cdot T)$

$\tau_{all} = \frac{Load}{shear\_area} = \frac{1}{2} \cdot \frac{Load}{(clearance \cdot T)}$



$T_2 = \frac{1}{2} \cdot \frac{Load}{(\tau_{all} \cdot clearance)}$ $T_2 = 1.796$ in <--- minimum thickness based on shear stress

The minimum thickness needed for the lug is determined by considering bearing and shear stresses and choosing the larger of the two minimum lug thicknesses. The minimum weld size is then converted into the nearest 1/8" increment weld size, greater than the actual calculated minimum.

$\max(T) = 1.796$ in $T_{min} = \frac{ceil(\max(T) \cdot 8)}{8}$ $T_{min} = 1.875$ in <--- ***minimum lug thickness***

Shear on Bolt, (Double Shear): (compare the allowable shear stress with the actual shear stress)

$Pin\_diameter = 2$ in

$shear\_area = \frac{2 \cdot \pi \cdot Pin\_diameter^2}{4}$ $shear\_area = 6.283$ in²

$Load = 20202.862$ Lbs

$\tau_{bolt} \quad \frac{Load}{shear\_area}$ $\tau_{bolt} = 3215.385$ psi

$\tau_{allowable\_shear} = .22 \cdot F_u$ $\tau_{allowable\_shear} = 12760$ psi

(The allowable shear stress is calculated from *Guidelines for Structural Bolting in Accordance with the AISC Eighth Edition "Manual of Steel Construction"*, Fermilab TM-1662, May 11, 1990.)

Tear-out on Lug Cross-section: (compare the allowable stress with the actual tear-out stress)

$lug\_width = 7.5$

$lug\_thickness = 2$

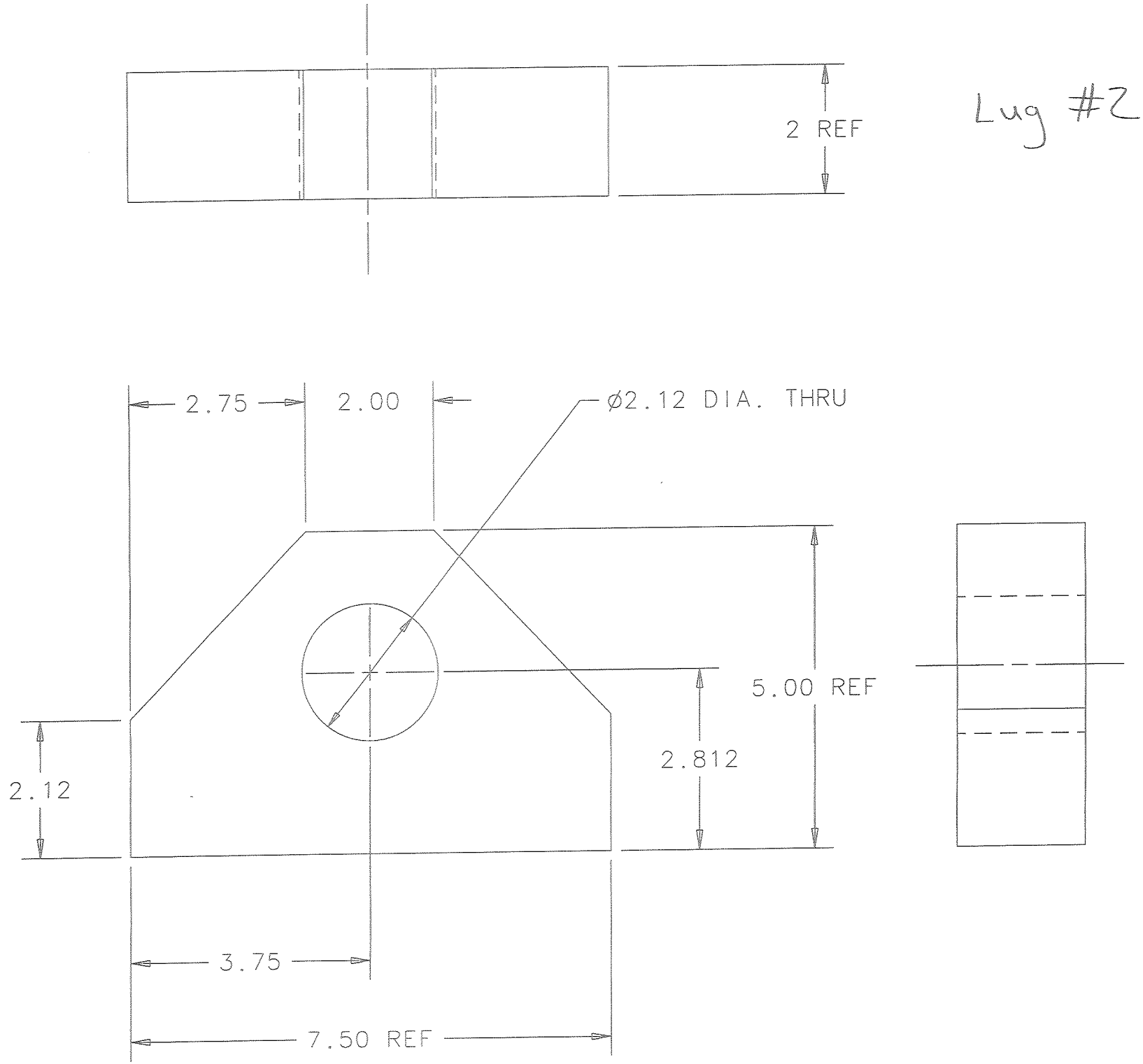
$Hole\_diameter = 2.125$

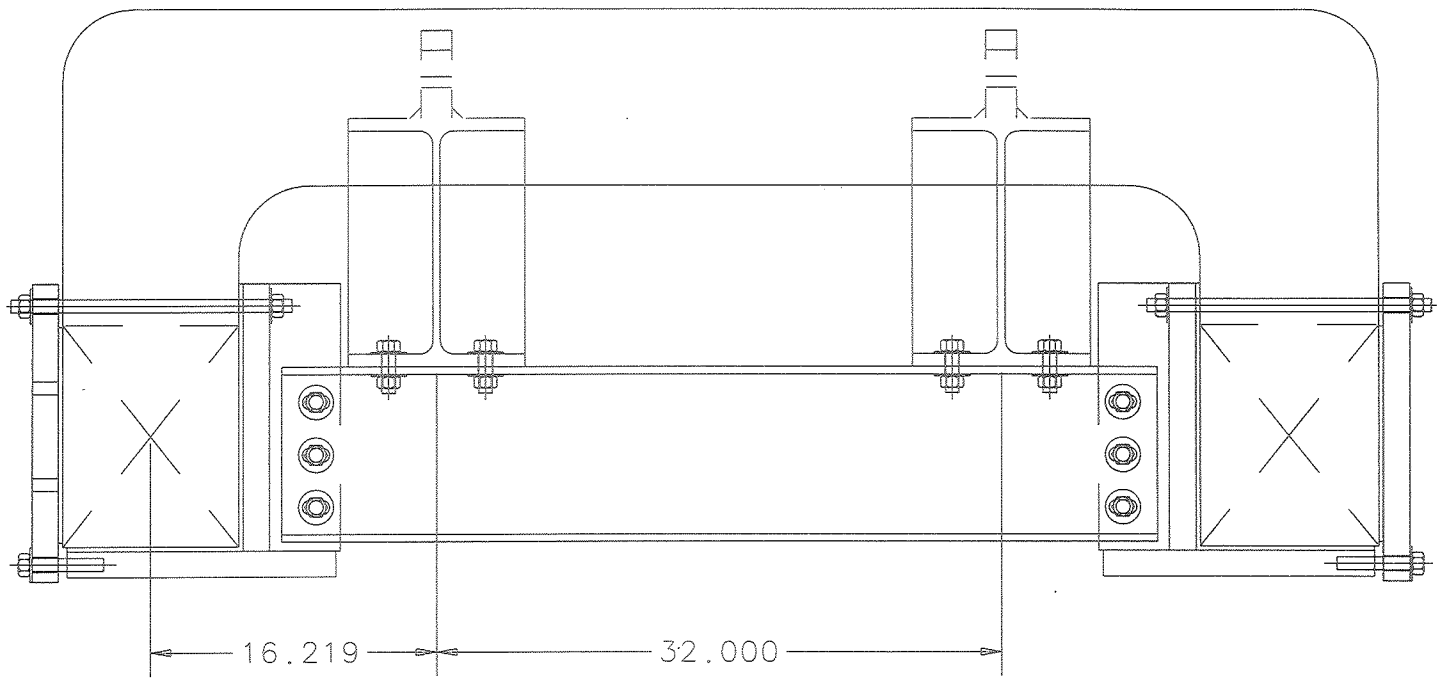
$Area \quad (lug\_width \cdot lug\_thickness) - (Hole\_diameter \cdot lug\_thickness)$ $Area = 10.75$ in²

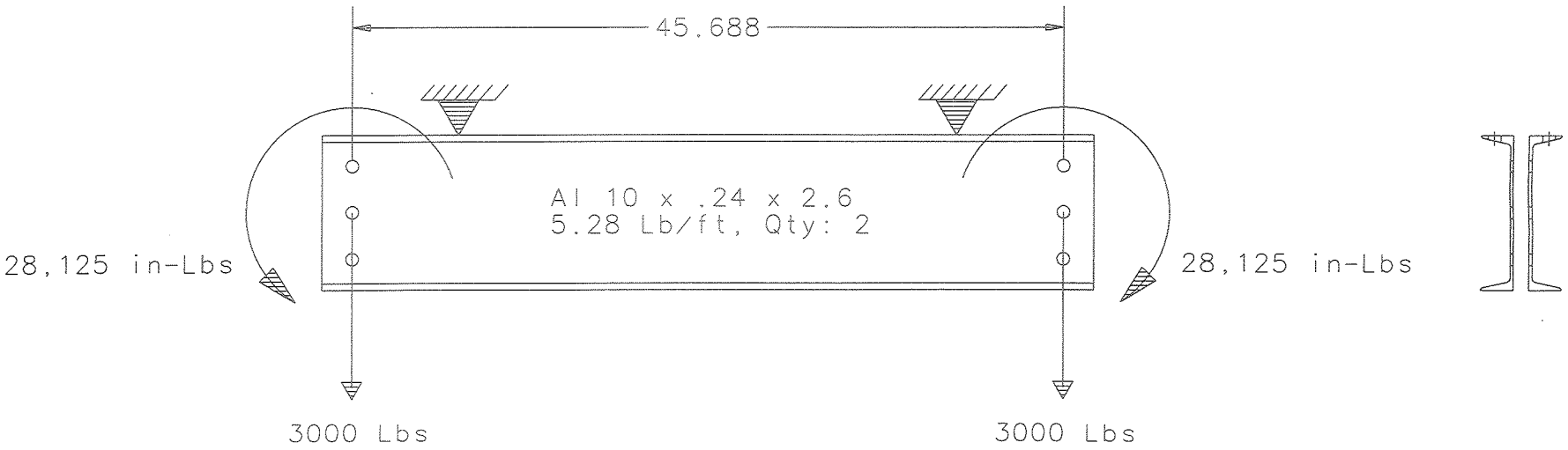
$Load = 20202.862$ Lbs

$Tear\_out = \frac{Load}{Area}$ $Tear\_out = 1879.336$ psi

$F_{all} = 10000$ psi


2 REF
Lug #2
2.75
2.00
Ø2.12 DIA. THRU
5.00 REF
2.812
2.12
3.75
7.50 REF


16.219
32.000


45.688
Al 10 x .24 x 2.6
5.28 Lb/ft, Qty: 2
28,125 in-Lbs
28,125 in-Lbs
3000 Lbs
3000 Lbs

Beam Analysis of Aluminum Channel 10 x .240 x 2.6
5.28 lb/ft

A finite element beam analysis was performed with the following results:

$\delta_{max} = .0047"$ $\quad M_{max} = 48,657$ in-lbs

$\sigma_{b_{max}} = 1,823$ psi

$\tau_{max_{xy}} = 336.4$ psi

} assume applied at the same point.

Combined stress on this beam is:

$\sigma_{max} = 1,883$ psi

$\sigma_{min} = -60.1$ psi

$\tau_{max} = 972$ psi

For a 6061-T6 Aluminum Channel, the allowable stresses are:

$$F_{all} = F_y/3 = \frac{35,000 \text{ psi}}{3} = 11,667 \text{ psi}$$

$$\tau_{all} = \tau_y/3 = \frac{20,000 \text{ psi}}{3} = 6,667 \text{ psi}$$

This beam is adequate

Beam analysis continued:

In the vertical lifting fixture configuration, the channels will temporarily be used as support columns as the main support beam is positioned. This means that a conservatively large 10 ton load (½ the coil weight plus the fixture weight) must be supported by the 8, aluminum channels. The channels have an unsupported length of 50 in.

$L = 50$ in.

$r_y = .71$ in

$\frac{L}{r_y} = 70.423$

Area $= 4.99\ in^2$

Load $= \frac{20{,}000\ lbs}{8\ supports} = 2{,}500\ lbs$

$\sigma_c = \frac{F}{A} = \frac{3500\ lbs}{4.99\ in^2} = 557\ psi$

From "Specifications for Aluminum Structures", the allowable compression load is:

$$\sigma_{c_{all}} = 10.5\ ksi - .036\left(\frac{L}{r_y}\right)$$

$$\sigma_{c_{all}} = 10.5\ ksi - .036(70.423) = 7{,}965\ psi$$

The beam is adequate as a column

HORIZONTAL BEAM WITH NO AXIAL LOADS: INPUT DATA cross beam
(MAXIMUM 25 SEGMENTS) channel

NUMBER OF SEGMENTS
3

SEGMENT NUMBER	SEGMENT LENGTH	MOMENT OF INERTIA	MATERIAL TYPE	BEAM AREA	ELEMENTS PER SEGMENT	UNIFORM LOAD	C
1	6.844	133.437	2	8.919	7	0.0	5.0
2	32.00	133.437	2	8.919	32	0.0	5.0
3	6.844	133.437	2	8.919	7	0.0	5.0

SEGMENT NUMBER	1st END Y-DISPL	1st END SLOPE	2nd END Y-DISPL	2nd END SLOPE	1st END FORCE	1st END MOMENT	2nd END FORCE	2nd END MOMENT
1	999.0	888.0	0.0	888.0	3000.0	-28125.0	0.0	0.0
2	0.0	888.0	0.0	888.0	0.0	0.0	0.0	0.0
3	0.0	888.0	999.0	888.0	0.0	0.0	3000.0	28125.0

NOTES:

INTEGERS MUST NOT HAVE A DECIMAL POINT
REAL NUMBERS MUST HAVE A DECIMAL POINT

999.0 ====> FREE END CONDITION IN Y-DISPLACEMENT

888.0 ====> FREE END CONDITION IN ROTATION

SLOPE IMPLIES A FORCED CONDITION THAT CAUSED A ROTATION IN THE BEAM AT THE POINT OF APPLICATION. (DATA VALUE SHOULD BE "RISE/RUN")

THE VALUE OF "C" IS THE DISTANCE FROM THE BENDING AXIS TO THE DISTANCE WHERE STRESS IS TO BE COMPUTED. FOR MAXIMUM STRESS, THE VALUE OF "C" SHOULD BE THE DISTANCE FROM THE BENDING AXIS TO THE EXTREME FIBERS OF THE BEAM.

MATERIAL TYPE NUMBER COORESPONDS TO THE MATERIAL NUMBER LISTED IN DATA FILE: mtype.dat

THE DATA VALUES LISTED HERE ARE NOT COLUMN SENSITIVE; THEY ARE ONLY SHOWN IN COLUMNS FOR CLARITY!

HORIZONTAL BEAM ANALYSIS USING FEM TECHNIQUES

NODE	GLOBAL COORDINATE
1	0.0000
2	0.9777
3	1.9554
4	2.9331
5	3.9109
6	4.8886
7	5.8663
8	6.8440
9	7.8440
10	8.8440
11	9.8440
12	10.8440
13	11.8440
14	12.8440
15	13.8440
16	14.8440
17	15.8440
18	16.8440
19	17.8440
20	18.8440
21	19.8440
22	20.8440
23	21.8440
24	22.8440
25	23.8440
26	24.8440
27	25.8440
28	26.8440
29	27.8440
30	28.8440
31	29.8440
32	30.8440
33	31.8440
34	32.8440
35	33.8440
36	34.8440
37	35.8440
38	36.8440
39	37.8440
40	38.8440
41	39.8217
42	40.7994
43	41.7771
44	42.7549
45	43.7326
46	44.7103
47	45.6880

ELEM NO.	NODAL CONNECTIVITY		INERTIA	EMOD	SPWT	XNU
1	1	2	.133E+03	0.1000E+08	0.000255	.3000
2	2	3	.133E+03	0.1000E+08	0.000255	.3000
3	3	4	.133E+03	0.1000E+08	0.000255	.3000
4	4	5	.133E+03	0.1000E+08	0.000255	.3000
5	5	6	.133E+03	0.1000E+08	0.000255	.3000
6	6	7	.133E+03	0.1000E+08	0.000255	.3000
7	7	8	.133E+03	0.1000E+08	0.000255	.3000
8	8	9	.133E+03	0.1000E+08	0.000255	.3000
9	9	10	.133E+03	0.1000E+08	0.000255	.3000

10	10	11	.133E+03	0.1000E+08	0.000255	.3000
11	11	12	.133E+03	0.1000E+08	0.000255	.3000
12	12	13	.133E+03	0.1000E+08	0.000255	.3000
13	13	14	.133E+03	0.1000E+08	0.000255	.3000
14	14	15	.133E+03	0.1000E+08	0.000255	.3000
15	15	16	.133E+03	0.1000E+08	0.000255	.3000
16	16	17	.133E+03	0.1000E+08	0.000255	.3000
17	17	18	.133E+03	0.1000E+08	0.000255	.3000
18	18	19	.133E+03	0.1000E+08	0.000255	.3000
19	19	20	.133E+03	0.1000E+08	0.000255	.3000
20	20	21	.133E+03	0.1000E+08	0.000255	.3000
21	21	22	.133E+03	0.1000E+08	0.000255	.3000
22	22	23	.133E+03	0.1000E+08	0.000255	.3000
23	23	24	.133E+03	0.1000E+08	0.000255	.3000
24	24	25	.133E+03	0.1000E+08	0.000255	.3000
25	25	26	.133E+03	0.1000E+08	0.000255	.3000
26	26	27	.133E+03	0.1000E+08	0.000255	.3000
27	27	28	.133E+03	0.1000E+08	0.000255	.3000
28	28	29	.133E+03	0.1000E+08	0.000255	.3000
29	29	30	.133E+03	0.1000E+08	0.000255	.3000
30	30	31	.133E+03	0.1000E+08	0.000255	.3000
31	31	32	.133E+03	0.1000E+08	0.000255	.3000
32	32	33	.133E+03	0.1000E+08	0.000255	.3000
33	33	34	.133E+03	0.1000E+08	0.000255	.3000
34	34	35	.133E+03	0.1000E+08	0.000255	.3000
35	35	36	.133E+03	0.1000E+08	0.000255	.3000
36	36	37	.133E+03	0.1000E+08	0.000255	.3000
37	37	38	.133E+03	0.1000E+08	0.000255	.3000
38	38	39	.133E+03	0.1000E+08	0.000255	.3000
39	39	40	.133E+03	0.1000E+08	0.000255	.3000
40	40	41	.133E+03	0.1000E+08	0.000255	.3000
41	41	42	.133E+03	0.1000E+08	0.000255	.3000
42	42	43	.133E+03	0.1000E+08	0.000255	.3000
43	43	44	.133E+03	0.1000E+08	0.000255	.3000
44	44	45	.133E+03	0.1000E+08	0.000255	.3000
45	45	46	.133E+03	0.1000E+08	0.000255	.3000
46	46	47	.133E+03	0.1000E+08	0.000255	.3000

NODAL DISPLACEMENTS	Y-DISPL	SLOPE
NODE 1	0.004727	-0.000780
NODE 2	0.003974	-0.000759
NODE 3	0.003244	-0.000735
NODE 4	0.002538	-0.000709
NODE 5	0.001859	-0.000681
NODE 6	0.001208	-0.000650
NODE 7	0.000588	-0.000618
NODE 8	0.000000	-0.000583
NODE 9	-0.000565	-0.000547
NODE 10	-0.001094	-0.000511
NODE 11	-0.001586	-0.000474
NODE 12	-0.002042	-0.000438
NODE 13	-0.002461	-0.000401
NODE 14	-0.002844	-0.000365
NODE 15	-0.003191	-0.000328
NODE 16	-0.003501	-0.000292
NODE 17	-0.003774	-0.000255
NODE 18	-0.004011	-0.000219
NODE 19	-0.004212	-0.000182
NODE 20	-0.004376	-0.000146
NODE 21	-0.004503	-0.000109
NODE 22	-0.004595	-0.000073
NODE 23	-0.004649	-0.000036
NODE 24	-0.004667	0.000000
NODE 25	-0.004649	0.000036

δ_{max}

NODE 26	-0.004595	0.000073
NODE 27	-0.004503	0.000109
NODE 28	-0.004376	0.000146
NODE 29	-0.004212	0.000182
NODE 30	-0.004011	0.000219
NODE 31	-0.003774	0.000255
NODE 32	-0.003501	0.000292
NODE 33	-0.003191	0.000328
NODE 34	-0.002844	0.000365
NODE 35	-0.002461	0.000401
NODE 36	-0.002042	0.000438
NODE 37	-0.001586	0.000474
NODE 38	-0.001094	0.000511
NODE 39	-0.000565	0.000547
NODE 40	0.000000	0.000583
NODE 41	0.000588	0.000618
NODE 42	0.001208	0.000650
NODE 43	0.001859	0.000681
NODE 44	0.002538	0.000709
NODE 45	0.003244	0.000735
NODE 46	0.003974	0.000759
NODE 47	0.004727	0.000780

NODAL REACTIONS	Y-FORCE	MOMENT
NODE 1	3000.0000	-28125.0000
NODE 2	0.0000	0.0000
NODE 3	0.0000	0.0000
NODE 4	0.0000	0.0000
NODE 5	0.0000	0.0000
NODE 6	0.0000	0.0000
NODE 7	0.0000	0.0000
NODE 8	-3000.0000	0.0000
NODE 9	0.0000	0.0000
NODE 10	0.0000	0.0000
NODE 11	0.0000	0.0000
NODE 12	0.0000	0.0000
NODE 13	0.0000	0.0000
NODE 14	0.0000	0.0000
NODE 15	0.0000	0.0000
NODE 16	0.0000	0.0000
NODE 17	0.0000	0.0000
NODE 18	0.0000	0.0000
NODE 19	0.0000	0.0000
NODE 20	0.0000	0.0000
NODE 21	0.0000	0.0000
NODE 22	0.0000	0.0000
NODE 23	0.0000	0.0000
NODE 24	0.0000	0.0000
NODE 25	0.0000	0.0000
NODE 26	0.0000	0.0000
NODE 27	0.0000	0.0000
NODE 28	0.0000	0.0000
NODE 29	0.0000	0.0000
NODE 30	0.0000	0.0000
NODE 31	0.0000	0.0000
NODE 32	0.0000	0.0000
NODE 33	0.0000	0.0000
NODE 34	0.0000	0.0000
NODE 35	0.0000	0.0000
NODE 36	0.0000	0.0000
NODE 37	0.0000	0.0000
NODE 38	0.0000	0.0000
NODE 39	0.0000	0.0000
NODE 40	-3000.0000	0.0000

NODE 41	0.0000	0.0000
NODE 42	0.0000	0.0000
NODE 43	0.0000	0.0000
NODE 44	0.0000	0.0000
NODE 45	0.0000	0.0000
NODE 46	0.0000	0.0000
NODE 47	3000.0000	28125.0000

ELEMENTAL SHEAR FORCES	LEFT	CENTER	RIGHT
ELEMENT 1	-3000.0000	3000.0000	3000.0000
ELEMENT 2	-3000.0000	3000.0000	3000.0000
ELEMENT 3	-3000.0000	3000.0000	3000.0000
ELEMENT 4	-3000.0000	3000.0000	3000.0000
ELEMENT 5	-3000.0000	3000.0000	3000.0000
ELEMENT 6	-3000.0000	3000.0000	3000.0000
ELEMENT 7	-3000.0000	3000.0000	3000.0000
ELEMENT 8	0.0000	0.0000	0.0000
ELEMENT 9	0.0000	0.0000	0.0000
ELEMENT 10	0.0000	0.0000	0.0000
ELEMENT 11	0.0000	0.0000	0.0000
ELEMENT 12	0.0000	0.0000	0.0000
ELEMENT 13	0.0000	0.0000	0.0000
ELEMENT 14	0.0000	0.0000	0.0000
ELEMENT 15	0.0000	0.0000	0.0000
ELEMENT 16	0.0000	0.0000	0.0000
ELEMENT 17	0.0000	0.0000	0.0000
ELEMENT 18	0.0000	0.0000	0.0000
ELEMENT 19	0.0000	0.0000	0.0000
ELEMENT 20	0.0000	0.0000	0.0000
ELEMENT 21	0.0000	0.0000	0.0000
ELEMENT 22	0.0000	0.0000	0.0000
ELEMENT 23	0.0000	0.0000	0.0000
ELEMENT 24	0.0000	0.0000	0.0000
ELEMENT 25	0.0000	0.0000	0.0000
ELEMENT 26	0.0000	0.0000	0.0000
ELEMENT 27	0.0000	0.0000	0.0000
ELEMENT 28	0.0000	0.0000	0.0000
ELEMENT 29	0.0000	0.0000	0.0000
ELEMENT 30	0.0000	0.0000	0.0000
ELEMENT 31	0.0000	0.0000	0.0000
ELEMENT 32	0.0000	0.0000	0.0000
ELEMENT 33	0.0000	0.0000	0.0000
ELEMENT 34	0.0000	0.0000	0.0000
ELEMENT 35	0.0000	0.0000	0.0000
ELEMENT 36	0.0000	0.0000	0.0000
ELEMENT 37	0.0000	0.0000	0.0000
ELEMENT 38	0.0000	0.0000	0.0000
ELEMENT 39	0.0000	0.0000	0.0000
ELEMENT 40	3000.0000	-3000.0000	-3000.0000
ELEMENT 41	3000.0000	-3000.0000	-3000.0000
ELEMENT 42	3000.0000	-3000.0000	-3000.0000
ELEMENT 43	3000.0000	-3000.0000	-3000.0000
ELEMENT 44	3000.0000	-3000.0000	-3000.0000
ELEMENT 45	3000.0000	-3000.0000	-3000.0000
ELEMENT 46	3000.0000	-3000.0000	-3000.0000

ELEMENTAL MOMENTS AT	LEFT	CENTER	RIGHT
ELEMENT 1	28125.0000	29591.5714	31058.1429
ELEMENT 2	31058.1429	32524.7143	33991.2857
ELEMENT 3	33991.2857	35457.8571	36924.4286
ELEMENT 4	36924.4286	38391.0000	39857.5714
ELEMENT 5	39857.5714	41324.1429	42790.7143

ELEMENT 6	42790.7143	44257.2857	45723.8571
ELEMENT 7	45723.8571	47190.4286	48657.0000
ELEMENT 8	48657.0000	48657.0000	48657.0000
ELEMENT 9	48657.0000	48657.0000	48657.0000
ELEMENT 10	48657.0000	48657.0000	48657.0000
ELEMENT 11	48657.0000	48657.0000	48657.0000
ELEMENT 12	48657.0000	48657.0000	48657.0000
ELEMENT 13	48657.0000	48657.0000	48657.0000
ELEMENT 14	48657.0000	48657.0000	48657.0000
ELEMENT 15	48657.0000	48657.0000	48657.0000
ELEMENT 16	48657.0000	48657.0000	48657.0000
ELEMENT 17	48657.0000	48657.0000	48657.0000
ELEMENT 18	48657.0000	48657.0000	48657.0000
ELEMENT 19	48657.0000	48657.0000	48657.0000
ELEMENT 20	48657.0000	48657.0000	48657.0000
ELEMENT 21	48657.0000	48657.0000	48657.0000
ELEMENT 22	48657.0000	48657.0000	48657.0000
ELEMENT 23	48657.0000	48657.0000	48657.0000 ← N_{max}
ELEMENT 24	48657.0000	48657.0000	48657.0000
ELEMENT 25	48657.0000	48657.0000	48657.0000
ELEMENT 26	48657.0000	48657.0000	48657.0000
ELEMENT 27	48657.0000	48657.0000	48657.0000
ELEMENT 28	48657.0000	48657.0000	48657.0000
ELEMENT 29	48657.0000	48657.0000	48657.0000
ELEMENT 30	48657.0000	48657.0000	48657.0000
ELEMENT 31	48657.0000	48657.0000	48657.0000
ELEMENT 32	48657.0000	48657.0000	48657.0000
ELEMENT 33	48657.0000	48657.0000	48657.0000
ELEMENT 34	48657.0000	48657.0000	48657.0000
ELEMENT 35	48657.0000	48657.0000	48657.0000
ELEMENT 36	48657.0000	48657.0000	48657.0000
ELEMENT 37	48657.0000	48657.0000	48657.0000
ELEMENT 38	48657.0000	48657.0000	48657.0000
ELEMENT 39	48657.0000	48657.0000	48657.0000
ELEMENT 40	48657.0000	47190.4286	45723.8571
ELEMENT 41	45723.8571	44257.2857	42790.7143
ELEMENT 42	42790.7143	41324.1429	39857.5714
ELEMENT 43	39857.5714	38391.0000	36924.4286
ELEMENT 44	36924.4286	35457.8571	33991.2857
ELEMENT 45	33991.2857	32524.7143	31058.1429
ELEMENT 46	31058.1429	29591.5714	28125.0000

ELEMENT STRAIN	LEFT	CENTER	RIGHT
ELEMENT 1	0.1054E-03	0.1109E-03	0.1164E-03
ELEMENT 2	0.1164E-03	0.1219E-03	0.1274E-03
ELEMENT 3	0.1274E-03	0.1329E-03	0.1384E-03
ELEMENT 4	0.1384E-03	0.1439E-03	0.1493E-03
ELEMENT 5	0.1493E-03	0.1548E-03	0.1603E-03
ELEMENT 6	0.1603E-03	0.1658E-03	0.1713E-03
ELEMENT 7	0.1713E-03	0.1768E-03	0.1823E-03
ELEMENT 8	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 9	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 10	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 11	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 12	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 13	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 14	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 15	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 16	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 17	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 18	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 19	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 20	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 21	0.1823E-03	0.1823E-03	0.1823E-03

ELEMENT 22	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 23	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 24	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 25	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 26	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 27	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 28	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 29	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 30	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 31	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 32	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 33	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 34	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 35	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 36	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 37	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 38	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 39	0.1823E-03	0.1823E-03	0.1823E-03
ELEMENT 40	0.1823E-03	0.1768E-03	0.1713E-03
ELEMENT 41	0.1713E-03	0.1658E-03	0.1603E-03
ELEMENT 42	0.1603E-03	0.1548E-03	0.1493E-03
ELEMENT 43	0.1493E-03	0.1439E-03	0.1384E-03
ELEMENT 44	0.1384E-03	0.1329E-03	0.1274E-03
ELEMENT 45	0.1274E-03	0.1219E-03	0.1164E-03
ELEMENT 46	0.1164E-03	0.1109E-03	0.1054E-03

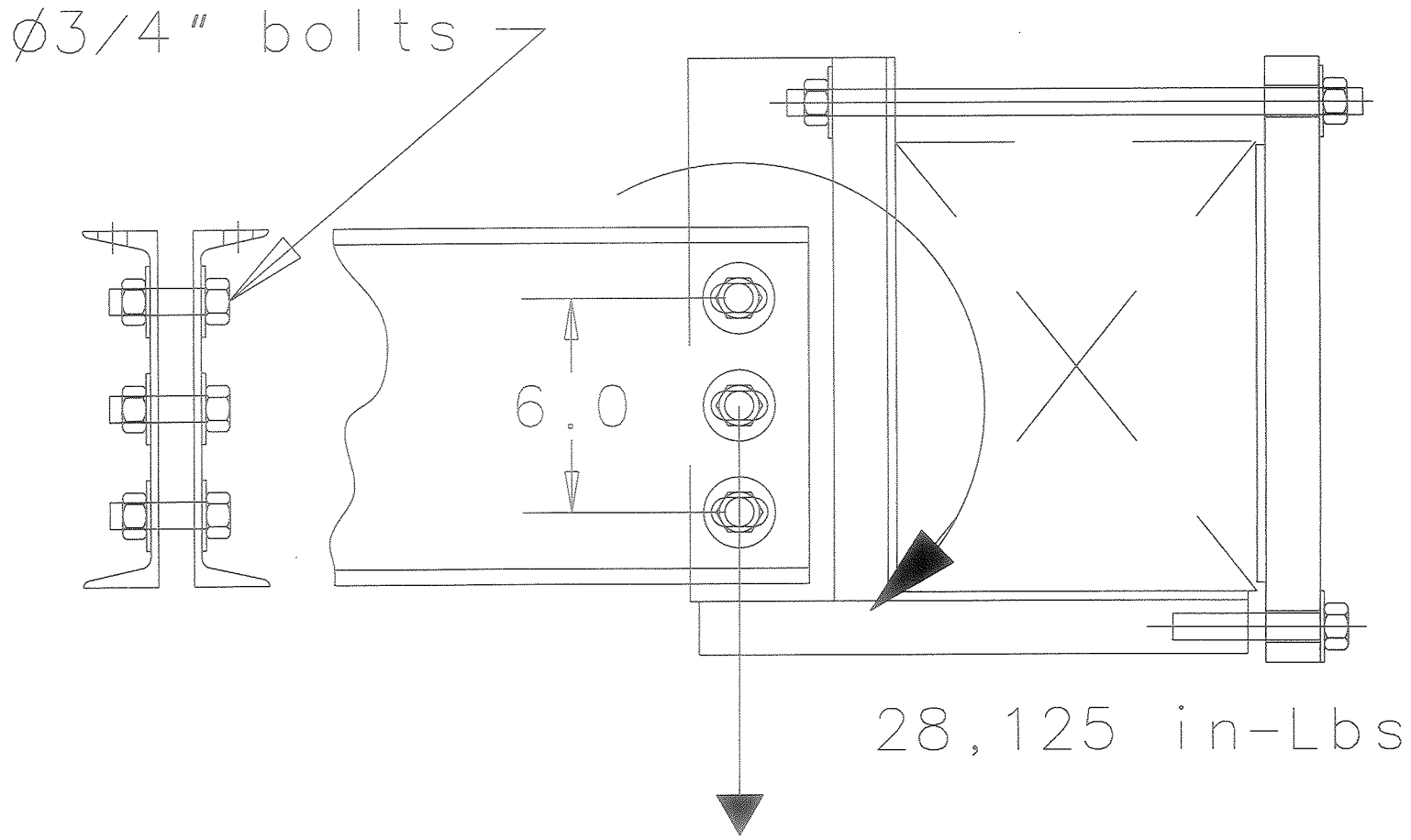
ELEMENT BENDING STRESS	LEFT	CENTER	RIGHT
ELEMENT 1	0.1054E+04	0.1109E+04	0.1164E+04
ELEMENT 2	0.1164E+04	0.1219E+04	0.1274E+04
ELEMENT 3	0.1274E+04	0.1329E+04	0.1384E+04
ELEMENT 4	0.1384E+04	0.1439E+04	0.1493E+04
ELEMENT 5	0.1493E+04	0.1548E+04	0.1603E+04
ELEMENT 6	0.1603E+04	0.1658E+04	0.1713E+04
ELEMENT 7	0.1713E+04	0.1768E+04	0.1823E+04
ELEMENT 8	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 9	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 10	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 11	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 12	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 13	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 14	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 15	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 16	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 17	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 18	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 19	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 20	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 21	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 22	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 23	0.1823E+04	0.1823E+04	0.1823E+04 ← $\sigma_{b\,max}$
ELEMENT 24	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 25	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 26	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 27	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 28	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 29	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 30	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 31	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 32	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 33	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 34	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 35	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 36	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 37	0.1823E+04	0.1823E+04	0.1823E+04

ELEMENT 38	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 39	0.1823E+04	0.1823E+04	0.1823E+04
ELEMENT 40	0.1823E+04	0.1768E+04	0.1713E+04
ELEMENT 41	0.1713E+04	0.1658E+04	0.1603E+04
ELEMENT 42	0.1603E+04	0.1548E+04	0.1493E+04
ELEMENT 43	0.1493E+04	0.1439E+04	0.1384E+04
ELEMENT 44	0.1384E+04	0.1329E+04	0.1274E+04
ELEMENT 45	0.1274E+04	0.1219E+04	0.1164E+04
ELEMENT 46	0.1164E+04	0.1109E+04	0.1054E+04

ELEMENT SHEAR STRESS	LEFT	CENTER	RIGHT
ELEMENT 1	0.3364E+03	0.3364E+03	0.3364E+03 ← τ_{max}
ELEMENT 2	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 3	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 4	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 5	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 6	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 7	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 8	0.1044E-08	0.9732E-09	0.1044E-08
ELEMENT 9	0.1044E-08	0.8759E-09	0.1044E-08
ELEMENT 10	0.2088E-09	0.3406E-09	0.2088E-09
ELEMENT 11	0.8354E-09	0.4866E-09	0.8354E-09
ELEMENT 12	0.6787E-09	0.8759E-09	0.6787E-09
ELEMENT 13	0.1357E-08	0.1217E-08	0.1357E-08
ELEMENT 14	0.1096E-08	0.6813E-09	0.1096E-08
ELEMENT 15	0.4177E-09	0.7299E-09	0.4177E-09
ELEMENT 16	0.4438E-09	0.4866E-10	0.4438E-09
ELEMENT 17	0.5221E-10	0.3893E-09	0.5221E-10
ELEMENT 18	0.1201E-08	0.6326E-09	0.1201E-08
ELEMENT 19	0.1436E-08	0.4623E-09	0.1436E-08
ELEMENT 20	0.7962E-09	0.4380E-09	0.7962E-09
ELEMENT 21	0.2428E-08	0.2409E-08	0.2428E-08
ELEMENT 22	0.7832E-09	0.9307E-09	0.7832E-09
ELEMENT 23	0.7575E-09	0.2428E-08	0.7575E-09
ELEMENT 24	0.1371E-09	0.8638E-09	0.1371E-09
ELEMENT 25	0.6135E-09	0.9489E-09	0.6135E-09
ELEMENT 26	0.1893E-08	0.1192E-08	0.1893E-08
ELEMENT 27	0.6265E-09	0.1460E-09	0.6265E-09
ELEMENT 28	0.2297E-08	0.1946E-08	0.2297E-08
ELEMENT 29	0.6265E-09	0.3406E-09	0.6265E-09
ELEMENT 30	0.3394E-09	0.7786E-09	0.3394E-09
ELEMENT 31	0.6787E-09	0.3893E-09	0.6787E-09
ELEMENT 32	0.5221E-09	0.7786E-09	0.5221E-09
ELEMENT 33	0.1984E-08	0.1509E-08	0.1984E-08
ELEMENT 34	0.5221E-09	0.7786E-09	0.5221E-09
ELEMENT 35	0.1357E-08	0.1168E-08	0.1357E-08
ELEMENT 36	0.9920E-09	0.1265E-08	0.9920E-09
ELEMENT 37	0.1357E-08	0.1265E-08	0.1357E-08
ELEMENT 38	0.1044E-08	0.8759E-09	0.1044E-08
ELEMENT 39	0.1044E-08	0.1071E-08	0.1044E-08
ELEMENT 40	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 41	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 42	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 43	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 44	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 45	0.3364E+03	0.3364E+03	0.3364E+03
ELEMENT 46	0.3364E+03	0.3364E+03	0.3364E+03

SELMA MAGNET COIL LIFTING FIXTURE

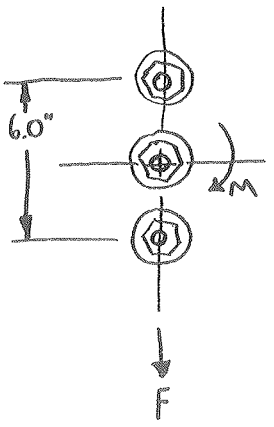
BOLT CALCULATIONS



Bolt Calculations:

Bolts, 3/4" ϕ, A325, QTY: 3 in double shear

F = 3,000 lb load
M = 28,125 in-lb moment



Assume:

3 bolts support load "F"

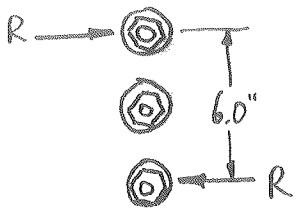
2 bolts take moment "M"

Shear due to force "F"

$$F/3\text{ bolts}/2\text{ shear planes} = 3{,}000/3/2 = 500\text{ lbs}$$

Shear due to Moment "M"

Resolve moment into force couple.



$$R(6.0) = 28{,}125\text{ in-lbs}$$

$$R = 28{,}125\text{ in-lbs}/6.0\text{ in}$$

$$R = 4{,}688\text{ lbs}$$

$$R/2\text{ shear planes} = 4{,}688\text{ lbs}/2 = 2{,}344\text{ lbs}$$

Combine shear loads:

$$V = \left[(500\ \text{lbs})^2 + (2{,}399\ \text{lbs})^2\right]^{1/2} = 2397\ \text{lbs}$$

Allowable Shear Stress:

From "Guidelines for Structural Bolting in Accordance with the AISC 9th ed. "Manual of Steel Construction," Fermilab TM-1664, 6/6/90, the allowable shear in a slip critical connection in a long slotted hole with the load acting parallel to the slot shall be limited to 10,000 psi as shown in table J3.2.

$$F_v = 10{,}000\ \text{psi}$$

$$\gamma = \frac{V}{\text{Nominal Area}} = \frac{2{,}397\ \text{lbs}}{\pi\,(3/8)^2} = \frac{2{,}397\ \text{lbs}}{.492\ \text{in}^2} = 5{,}426\ \text{psi}$$

$$\gamma < F_v \quad \underline{\text{OK}}$$

Minimum tension Required for Slip-Critical connection:

Table 9, p. 5-274, AISC Manual of Steel Construction, 9th ed.

Minimum tension for A325, 3/4" ϕ bolt = 28,000 lbs

Table 5, p. 5-275, AISC Manual of Steel Construction, 9th ed.

Nut Rotation from snug tight Condition = 1/3 turn

Threaded Rods and 3/4" ϕ connection bolts in tension:

* Approximately 15 tons (30,000 lbs) will be supported by 16, 3/4" ϕ bolts and threaded rod.

Each bolt has a gross stress area of .492 in^2 for a total cross-sectional area of 7.069 in^2

This is a tensile stress of:

$$\sigma_t = \frac{30{,}000 \text{ lbs}}{7.069 \text{ in}^2} = 4{,}249 \text{ psi} < .33 F_u^{**}$$

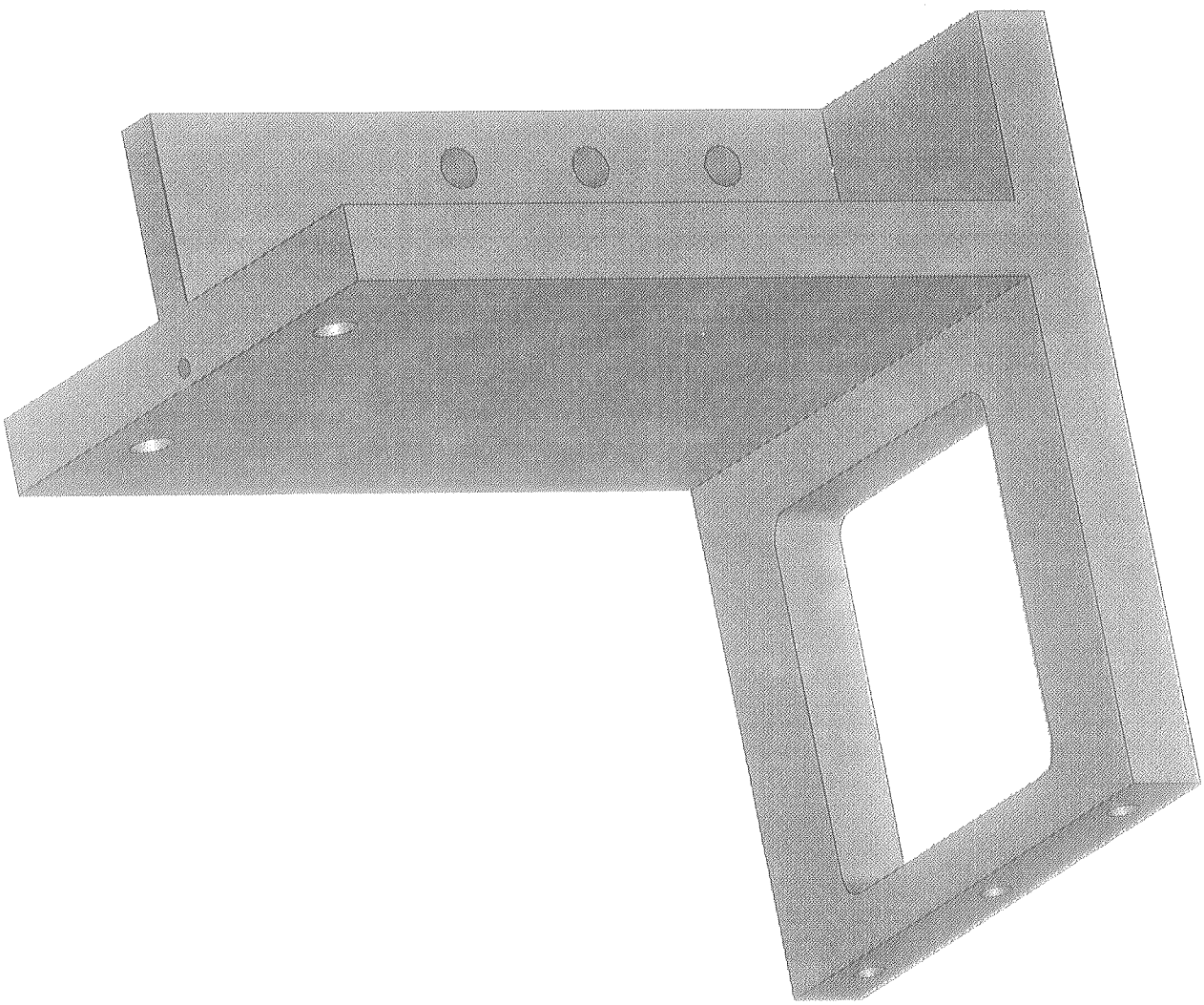
The design is adequate.

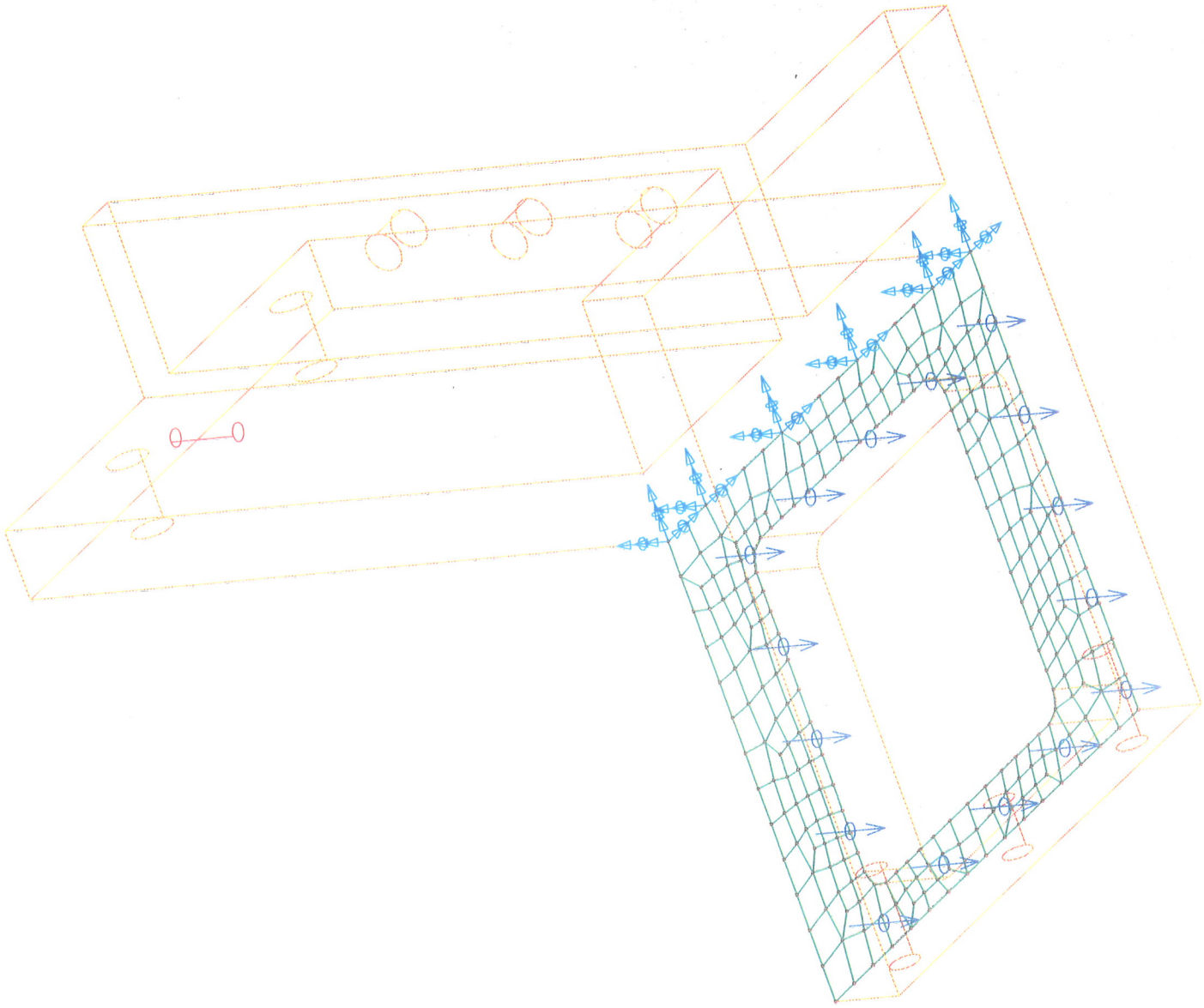
** From: "Guidelines for Structural bolting in Accordance with the 9th ed. AISC Manual of Steel Construction, Fermilab TM-1664, 6/6/90",

the allowable tensile stress is:

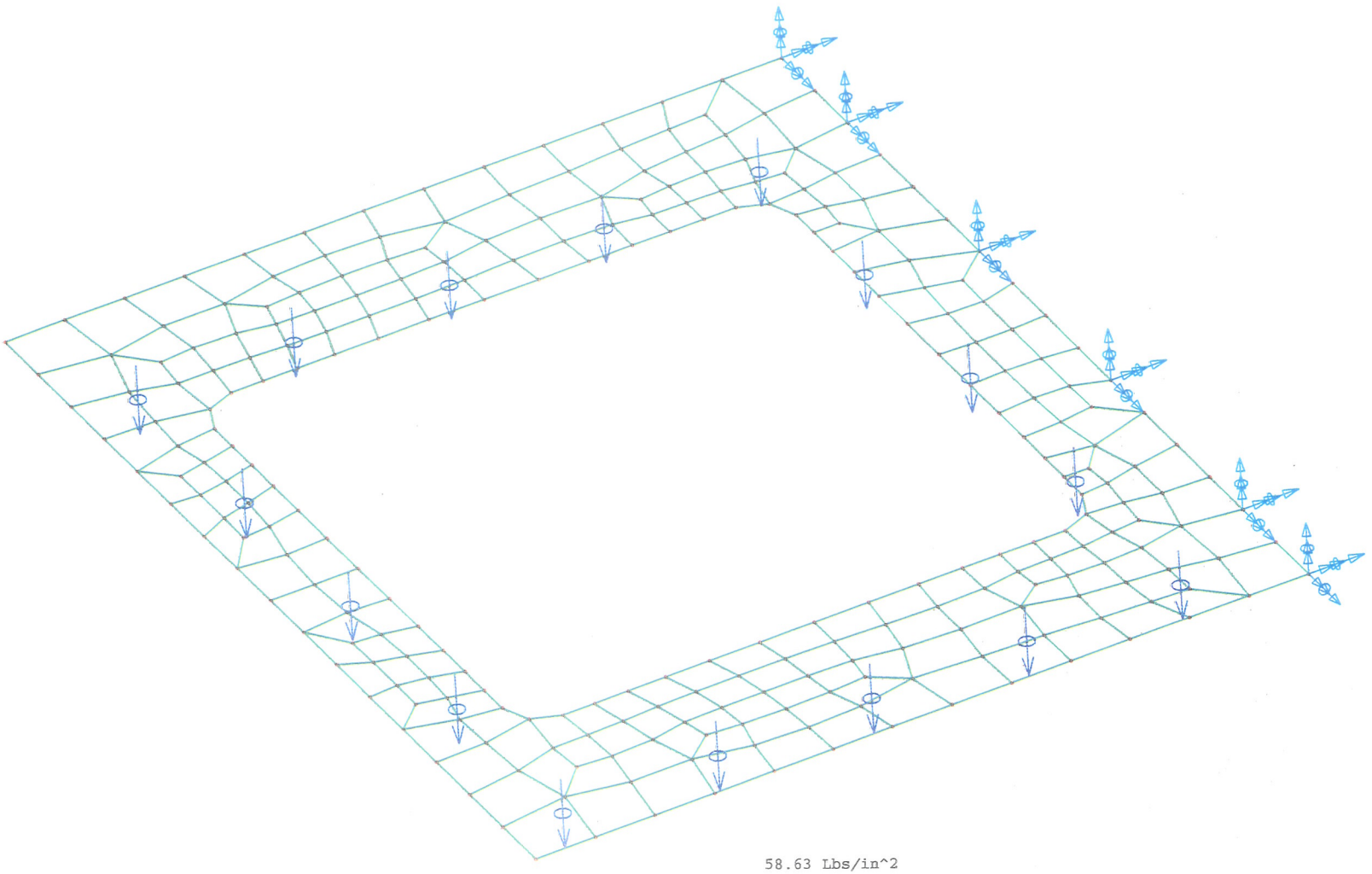
$$F_{all} = .33 F_u$$
$$= .33(60{,}000 \text{psi})$$
$$= 19{,}800 \text{ psi} \leftarrow \text{conservatively low.}$$

* The actual number of fasteners is 20, but for symmetry, I assumed that 16 bolts would take the entire load.





L bracket Stress Analysis

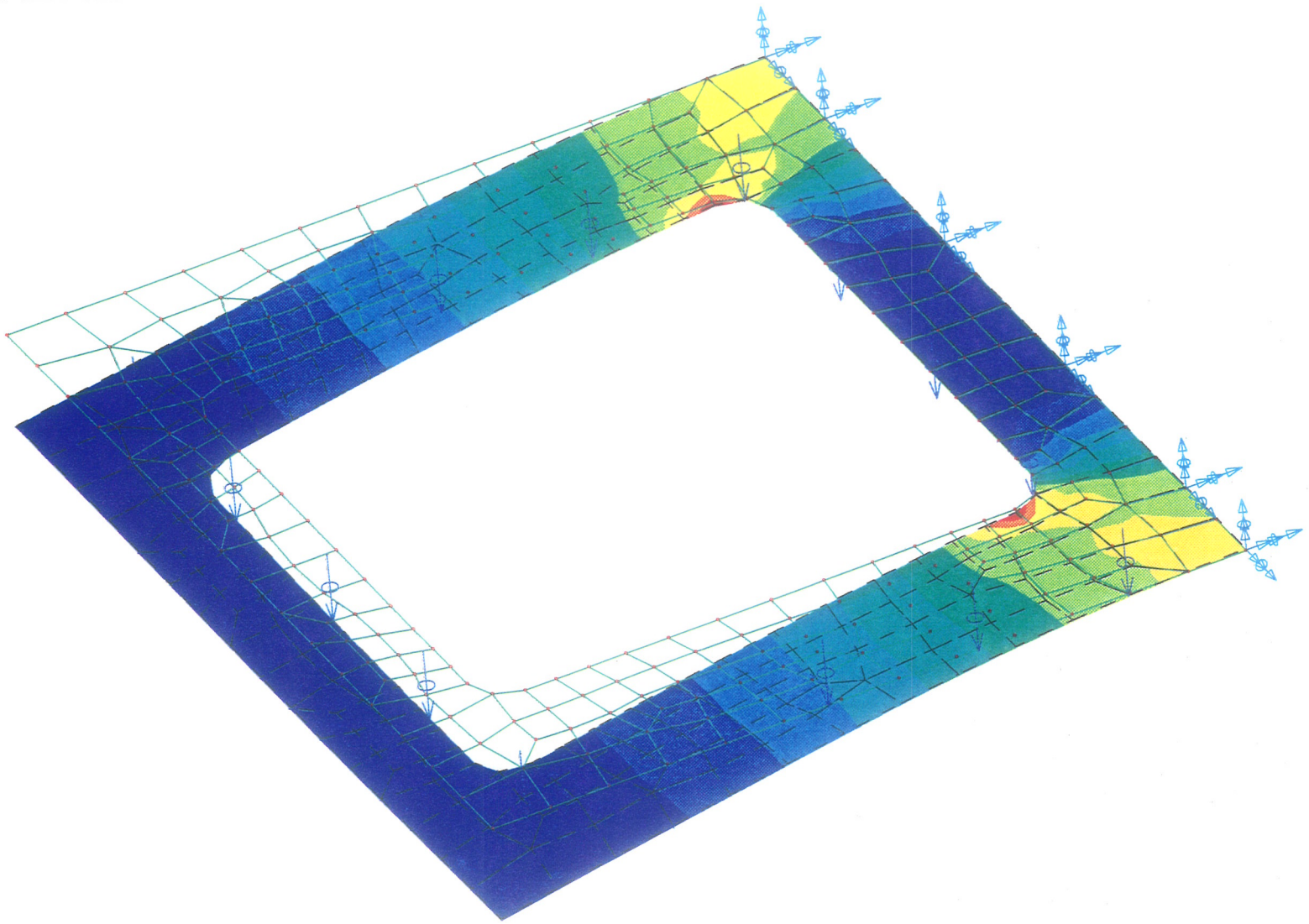


58.63 Lbs/in^2

(3750 Lbs uniformly distributed)

selma_magnet

RESULTS: 3- B.C. 1,LOAD 1,STRESS_3
STRESS - VON MISES MIN: 9.33E+01 MAX: 1.03E+04
DEFORMATION: 1- B.C. 1,LOAD 1,DISPLACEMENT_1
DISPLACEMENT - MAG MIN: 0.00E+00 MAX: 1.20E-02
FRAME OF REF: PART

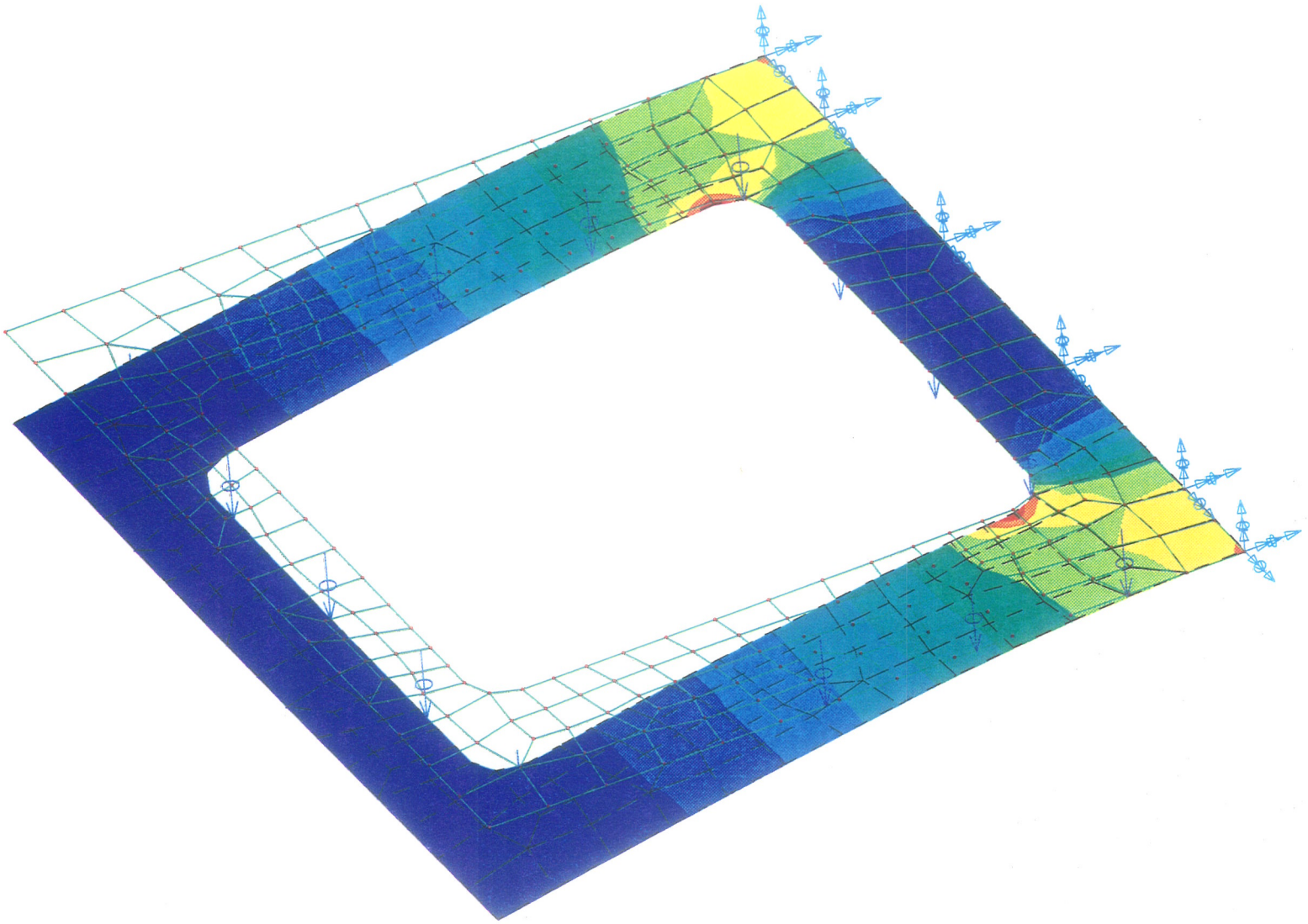


VALUE OPTION:ACTUAL
SHELL SURFACE: TOP

1.03E+04
9.24E+03
8.22E+03
7.20E+03
6.19E+03
5.17E+03
4.16E+03
3.14E+03
2.12E+03
1.11E+03
9.33E+01

selma_magnet

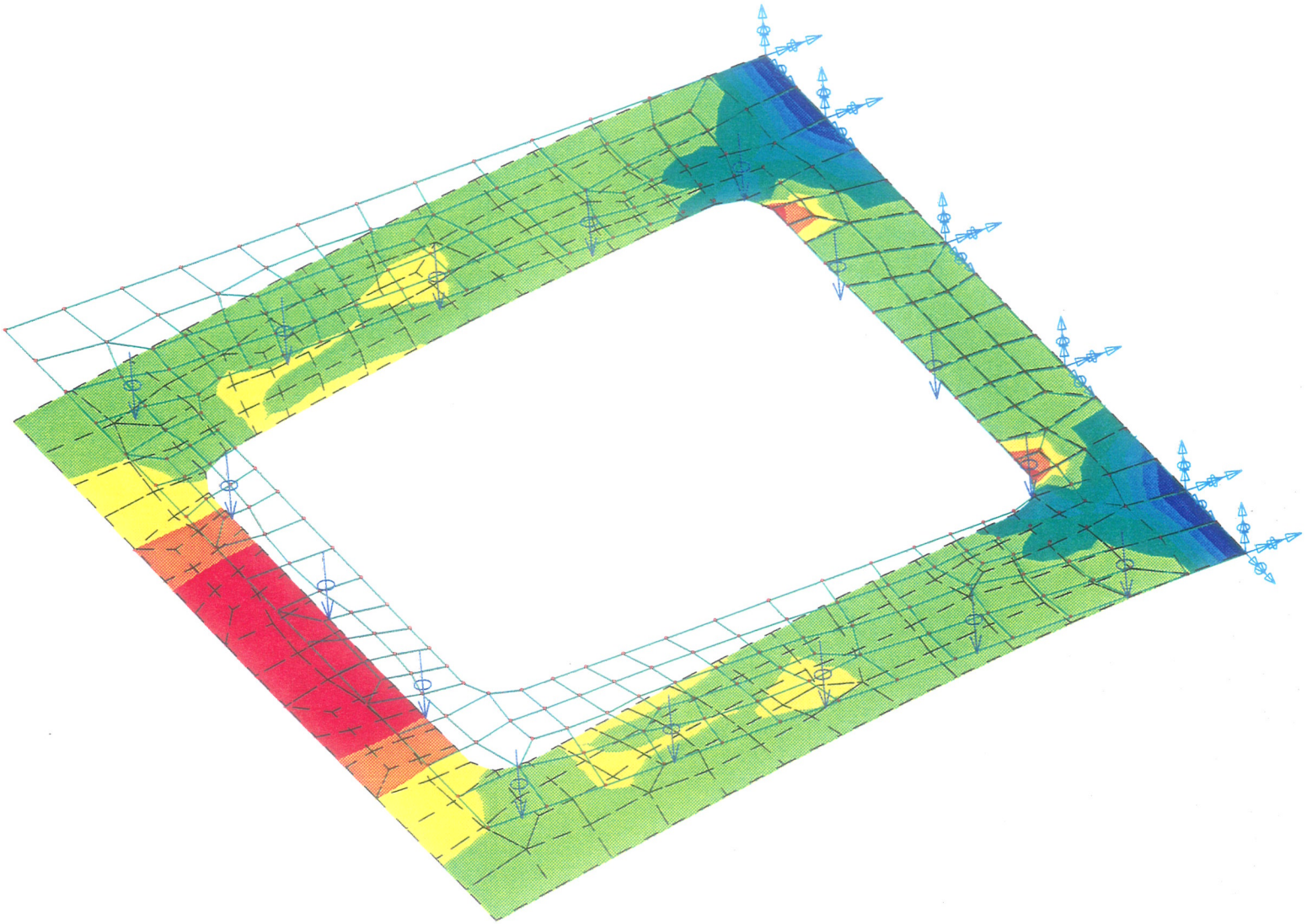
RESULTS: 3- B.C. 1,LOAD 1,STRESS_3
STRESS - MAX SHEAR MIN: 5.18E+01 MAX: 5.31E+03
DEFORMATION: 1- B.C. 1,LOAD 1,DISPLACEMENT_1
DISPLACEMENT - MAG MIN: 0.00E+00 MAX: 1.20E-02
FRAME OF REF: PART



VALUE OPTION:ACTUAL
SHELL SURFACE: TOP
5.31E+03
4.78E+03
4.25E+03
3.73E+03
3.20E+03
2.68E+03
2.15E+03
1.63E+03
1.10E+03
5.77E+02
5.18E+01

selma_magnet

RESULTS: 3- B.C. 1,LOAD 1,STRESS_3
STRESS - MAX PRIN MIN:-2.31E+03 MAX: 1.04E+03
DEFORMATION: 1- B.C. 1,LOAD 1,DISPLACEMENT_1
DISPLACEMENT - MAG MIN: 0.00E+00 MAX: 1.20E-02
FRAME OF REF: PART

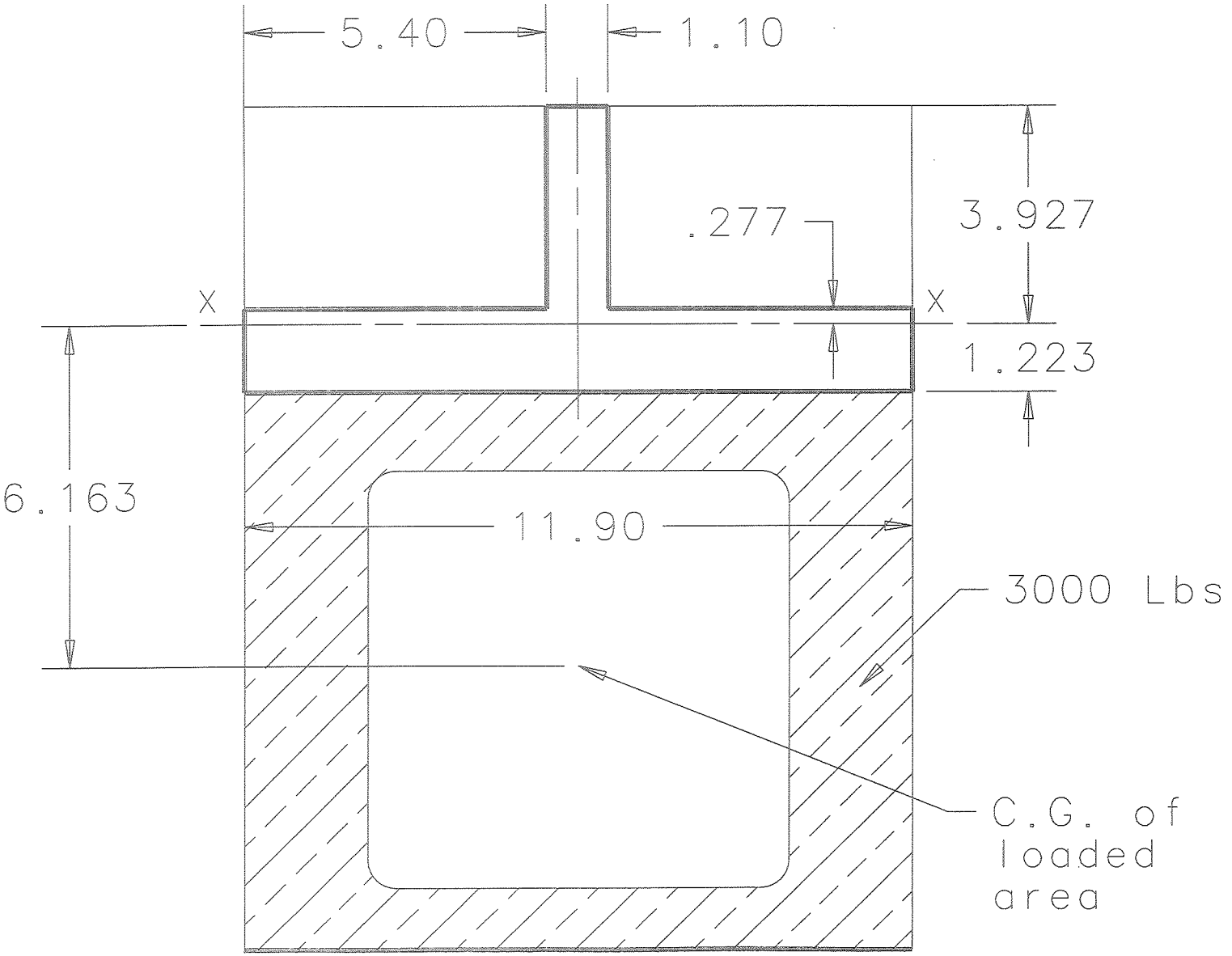


VALUE OPTION:ACTUAL
SHELL SURFACE: TOP

1.04E+03
7.03E+02
3.68E+02
3.33E+01
-3.02E+02
-6.37E+02
-9.72E+02
-1.31E+03
-1.64E+03
-1.98E+03
-2.31E+03

SELMA MAGNET COIL LIFTING FIXTURE

"L" BRACKET WELD CALCULATION



Calculation of moment of inertia for the line weld of the "L" shaped bracket

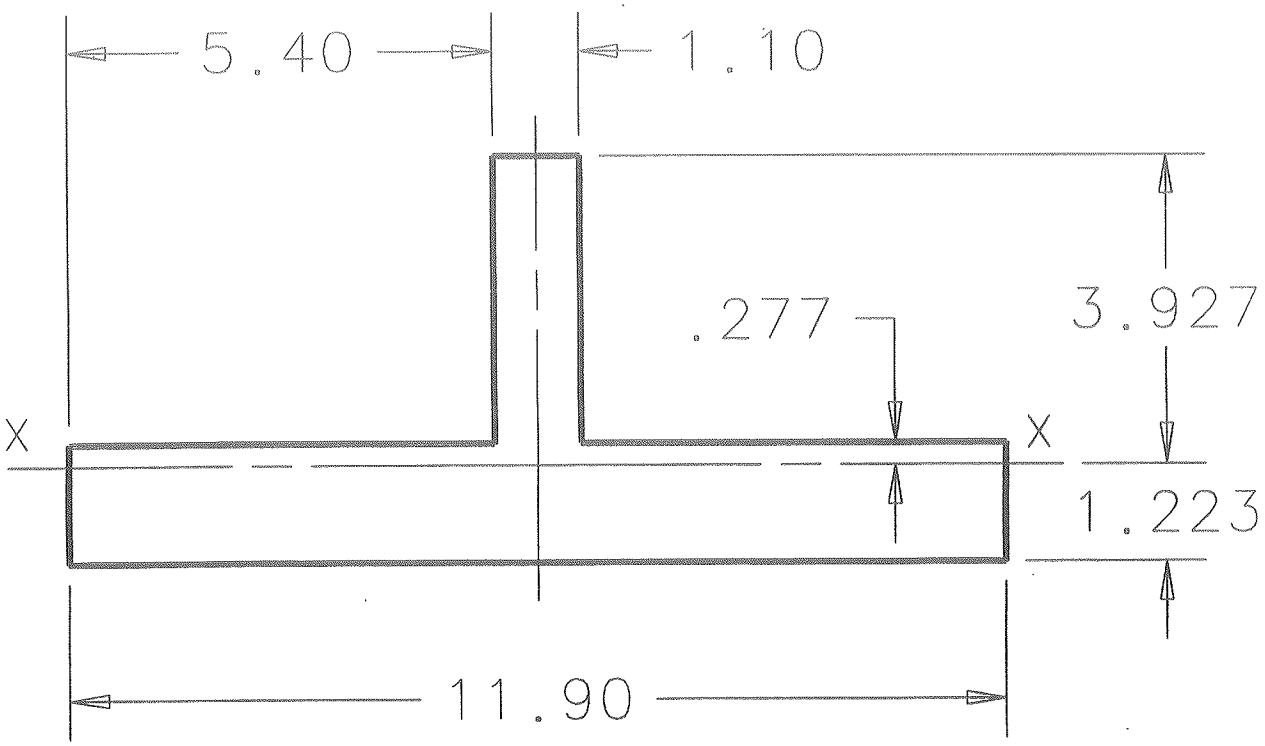
Assume that the line weld is unity (1") in thickness

$$I_{x.weld} = \int_0^{11.9} 1.223^2\,dx + 2\cdot\int_0^{5.4} .277^2\,dx + \int_{5.4}^{6.5} 3.927^2\,dx + 2\cdot\int_{.277}^{1.223} y^2\,dy - 2\cdot\int_{.277}^{3.927} y^2\,dy$$

$$I_{x.weld} = 77.184\ in^3$$

SELMA MAGNET COIL LIFTING FIXTURE

"L" BRACKET WELD CALCULATION



"L" Bracket Weld Calculations Continued:

As shown in the diagram, the 3,000 lb load causes a bending moment and a shear on the weld. The moment due to this 3,000 lb load is:

$$M_{bx} = (3{,}000 \text{ lbs})(6.163") = 18{,}489 \text{ in-lbs}$$

$$c = 3.927 \text{ in}$$

$$I_{x.weld} = 77.184 \text{ in}^3$$

The maximum load on the weld due to bending is:

$$P_{bx} = \frac{M_{bx}\, c}{I_{x.weld}} = \frac{(18{,}489 \text{ in-lbs})(3.927 \text{ in})}{77.184 \text{ in}^3} = 940.69 \text{ lbs/in}$$

The load due to shear is:

$$P_v = \frac{3{,}000 \text{ lbs}}{23.3 \text{ in}} = 128.76 \text{ lbs/in}$$

The total load per inch is: $P = 940.69 \text{ lb/in} + 128.76 \text{ lb/in} = 1{,}069 \text{ lbs/in}$

Size the fillet weld based on the total weld load: (Assume all fillet weld)

$t_e = .707(a)$ $\quad a \equiv$ length of the leg of the fillet weld.

$P = t_e \tau_{all}$ where $\tau_{all} = 5{,}000$ psi (allowable shear of the base material)

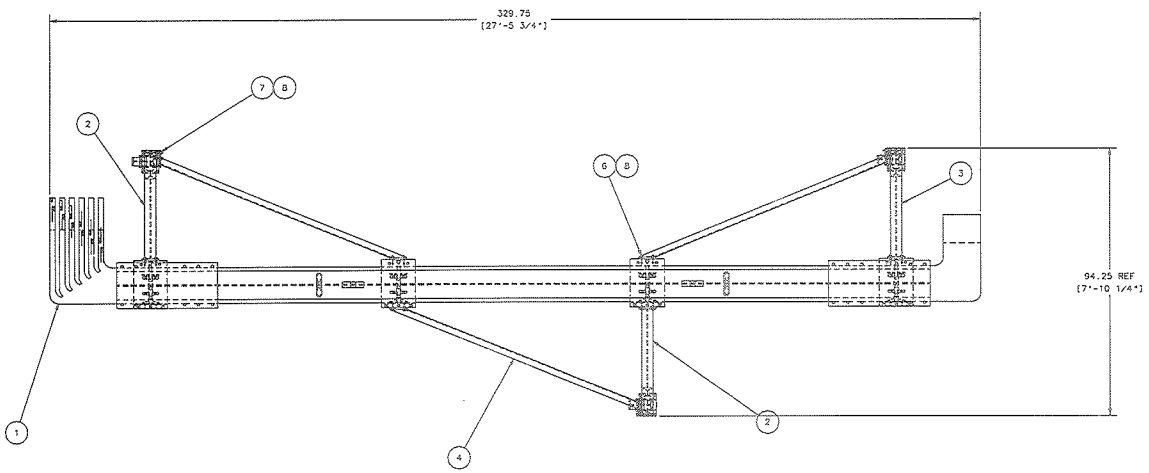
$P = .707(a)\, \tau_{all}$

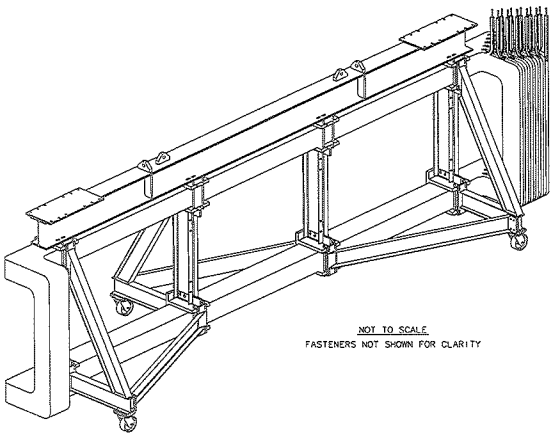
$$a_{min} = 1.4144\, P/\tau_{all} = \frac{(1.4144)(1069 \text{ lbs/in})}{5000 \text{ lb/in}^2} = .3025 \text{ in}$$

Specify 5/16" weld (E7018) for this weld.

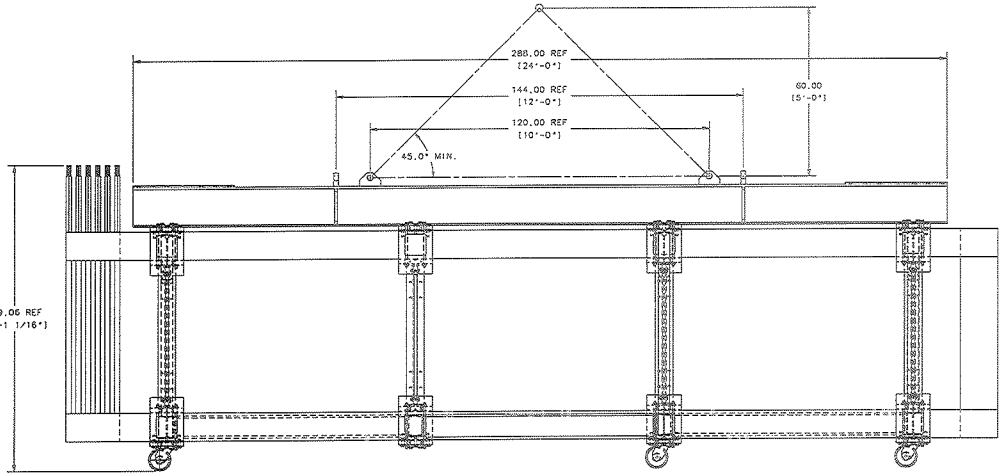
REV.	D

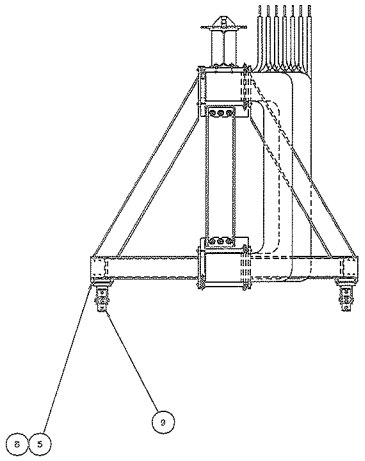
DRAWN	DATE
APPROVED	DATE





NOT TO SCALE
FASTENERS NOT SHOWN FOR CLARITY





FULL ASSEMBLY WEIGHT = 29,000 LBS.

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
9	SURPLUS STOCK	8" CASTER - STEEL WHEEL	3
8	COML	FLAT WASHER - A325 1/2 SCREW SIZE	50
7	COML	HEX HD. SCREW - GRADE 2 1/2-13 UNC-2A X 2.50" LG.	12
6	COML	HEX HD. SCREW - GRADE 2 1/2-13 UNC-2A X 2.00" LG.	36
5	COML	HEX HD. SCREW - GRADE 2 1/2-13 UNC-2A X 1.25" LG.	12
4	MD-328412	STABILIZER ARM	3
3	MD-328413	OUTRIGGER WELDMENT #1	1
2	MD-328414	OUTRIGGER WELDMENT #2	2
1	ME-328374	VERTICAL ASSEMBLY	1

PARTS LIST

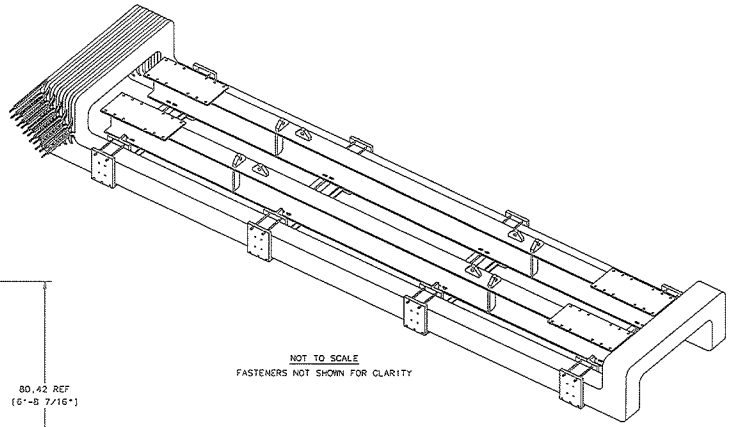
UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/15/96
XX	XXX	ANGLES	DRAWN	G SMITH	2/19/96
± .03	± -----	± -----	CHECKED		
1. BREAK ALL SHARP EDGES .015 MAX.			APPROVED		
2. DO NOT SCALE DWG.			USED ON		
3. DIMENSIONING IS ACCORD WITH ANSI Y14.5M-1982					
4. ALL DIMENSIONS ARE IN INCHES.			MATERIAL		
125 MAX. ALL MACHINED SURFACES			LISTED		

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

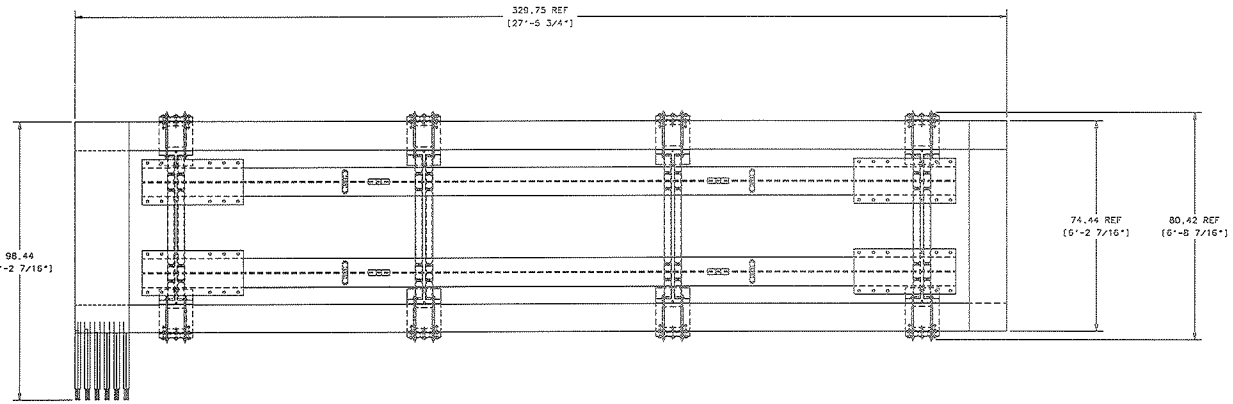
RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
VERTICAL ASSEMBLY W/RIGGING

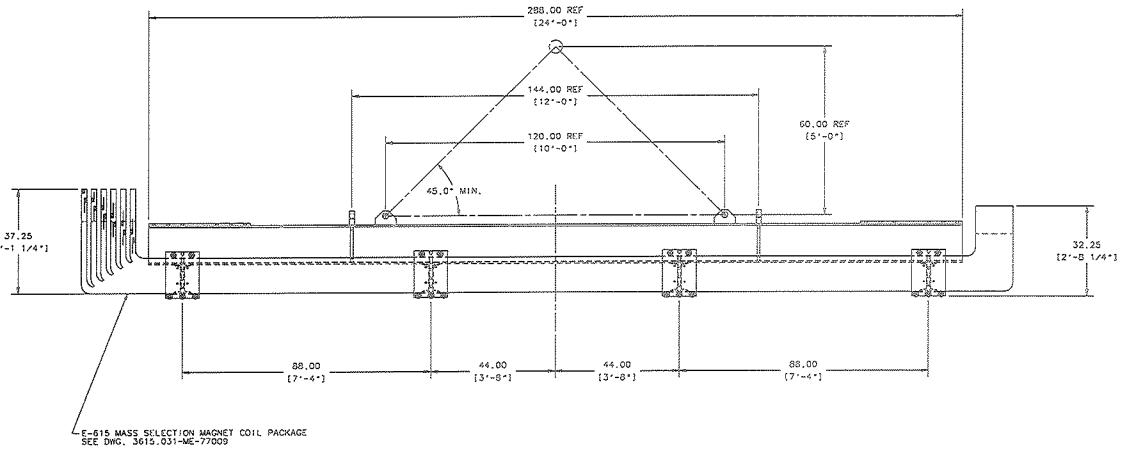
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/16	3210.300-ME-328433	1 OF 1	

REV.	BY	DRAWN	DATE
		APPROVED	DATE

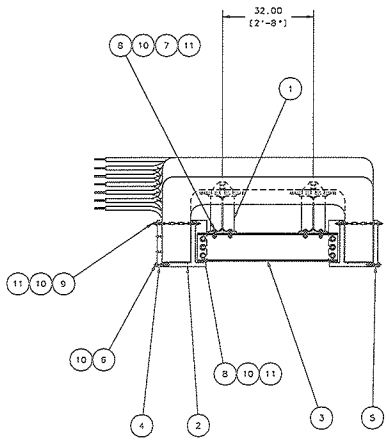


NOT TO SCALE
FASTENERS NOT SHOWN FOR CLARITY





E-615 MASS SELECTION MAGNET COIL PACKAGE
SEE DWG. 3615.031-ME-77009



FULL ASSEMBLY WEIGHT = 30,500 LBS.

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
11	COML	HEX. NUT - A325 3/4-10 UNC-2B	88
10	COML	FLAT WASHER - A325 3/4 SCREW SIZE	136
9	FERMI # 1530-4180	THREADED ROD - STEEL 3/4-10 UNC-2A X 16.00" LG.	16
8	COML	HEX HD. SCREW - A325 3/4-10 UNC-2A X 2.50" LG.	56
7	COML	BEVEL WASHERS - 3/4" STEEL	32
6	COML	HEX HD. SCREW - A325 3/4-10 UNC-2A X 3.50" LG.	24
5	MC-328375	CLAMP PLATE #2	4
4	MC-328374	CLAMP PLATE #1	4
3	MC-328373	CHANNEL CROSS SECTION	8
2	MC-328366	"L" BRACKET WELDMENT	8
1	MO-328386	BEAM WELDMENT	2

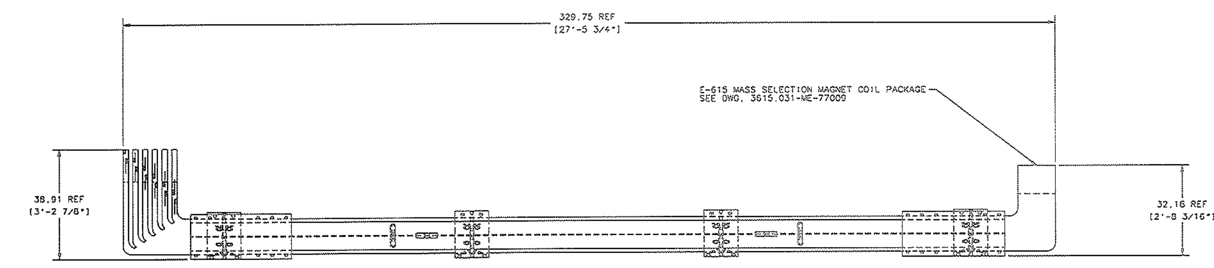
PARTS LIST

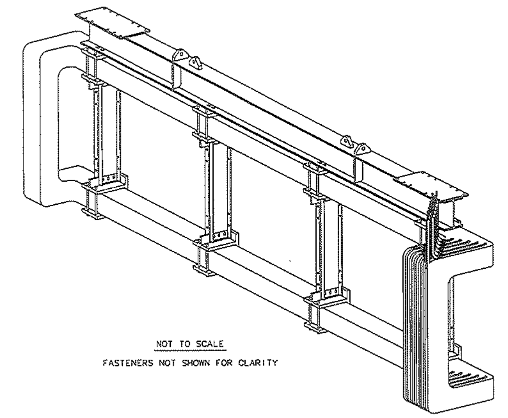
UNLESS OTHERWISE SPECIFIED:			ORIGINATOR	DON MITCHELL	2/16/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/19/96
± .03	± ----	± ----	CHECKED		
1. BREAK ALL SHARP EDGES .015 MAX.			APPROVED		
2. THIS IS A SCALE DRWG.			USED ON		
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD.					
4. ALL DIMENSIONS ARE IN INCHES.			MATERIAL		
125 MAX. ALL MACHINED SURFACES			LISTED		

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
HORIZONTAL ASSEMBLY

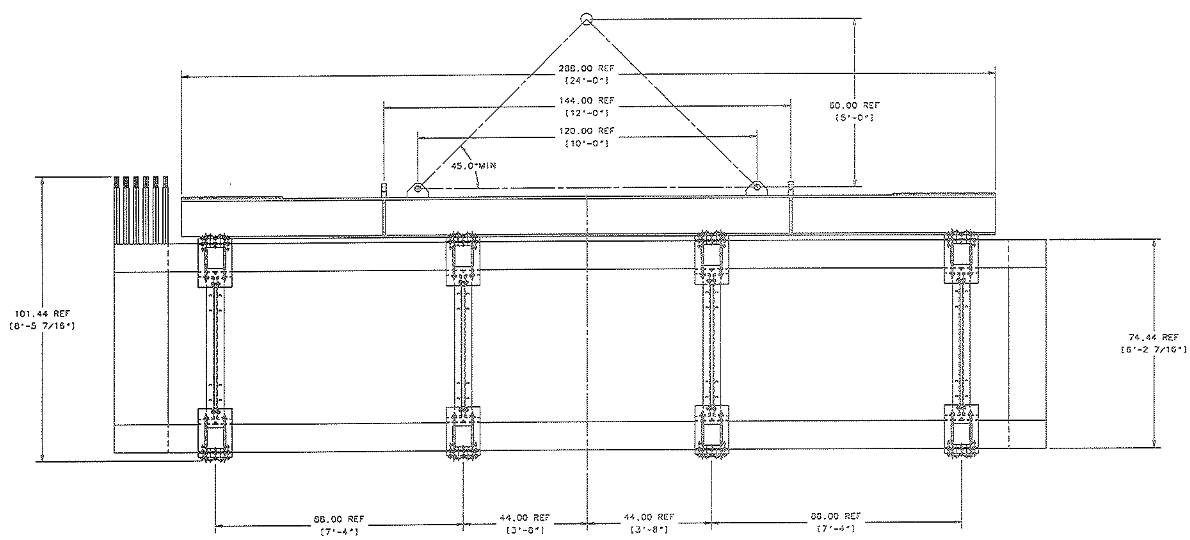
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/16	9210.300-ME-328365	1 OF 1	

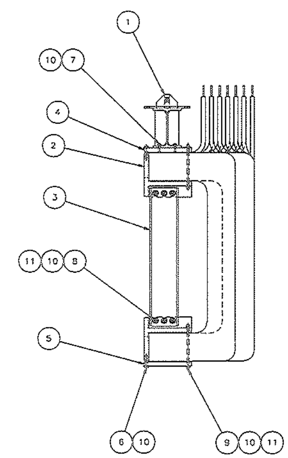




NOT TO SCALE

FASTENERS NOT SHOWN FOR CLARITY





FULL ASSEMBLY WEIGHT = 28,500 LBS

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
11	COML	HEX. NUT - A325 3/4-10 UNC-2B	56
10	COML	FLAT WASHER - A325 3/4 SCREW SIZE	120
9	FERMI # 1530-4180	THREADED ROD - STEEL 3/4-10 UNC-2A X 16.00" LG.	16
8	COML	HEX HD. SCREW - A325 3/4-10 UNC-2A X 2.50" LG.	24
7	COML	HEX HD. SCREW - A325 3/4-10 UNC-2A X 2.00" LG.	16
6	COML	HEX HD. SCREW - A325 3/4-10 UNC-2A X 3.50" LG.	24
5	MC-328375	CLAMP PLATE #2	4
4	MC-328374	CLAMP PLATE #1	4
3	MC-328373	CHANNEL CROSS SECTION	8
2	MC-328366	"L" BRACKET WELDMENT	8
1	MD-328386	BEAM WELDMENT	1

PARTS LIST

UNLESS OTHERWISE SPECIFIED: .XX ±.03, .XXX ± —, ANGLES ± —

1. BREAK ALL SHARP EDGES .015 MAX.
3. DO NOT SCALE DWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982
4. ALL DIMENSIONS ARE IN INCHES.

125 MAX. ALL MACHINED SURFACES

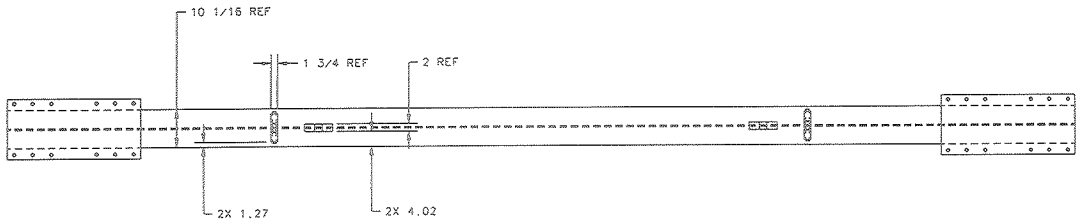
ORIGINATOR	DON MITCHELL	2/16/96
DRAWN	G SMITH	2/19/96
CHECKED		
APPROVED		
USED ON	ME-328433	
MATERIAL	LISTED	

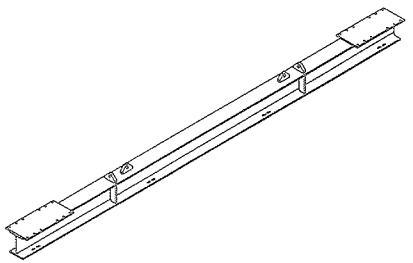
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

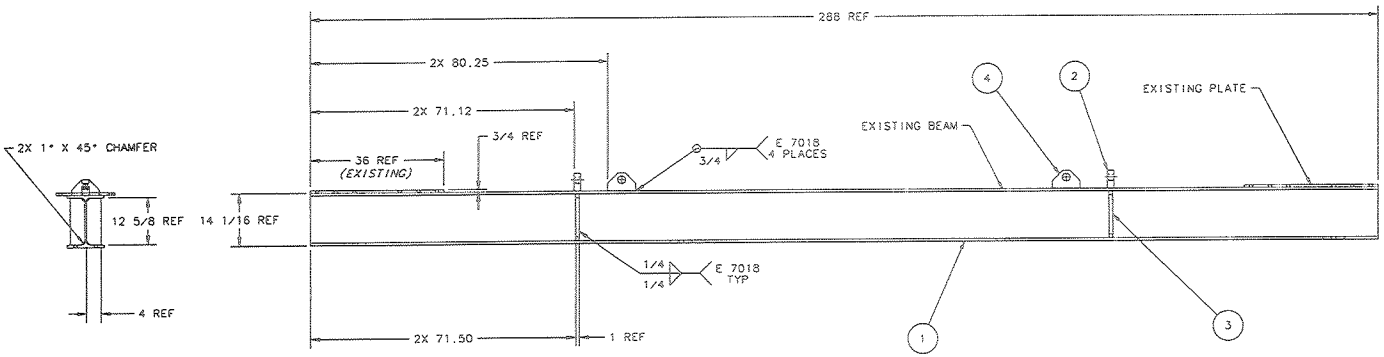
RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
VERTICAL ASSEMBLY

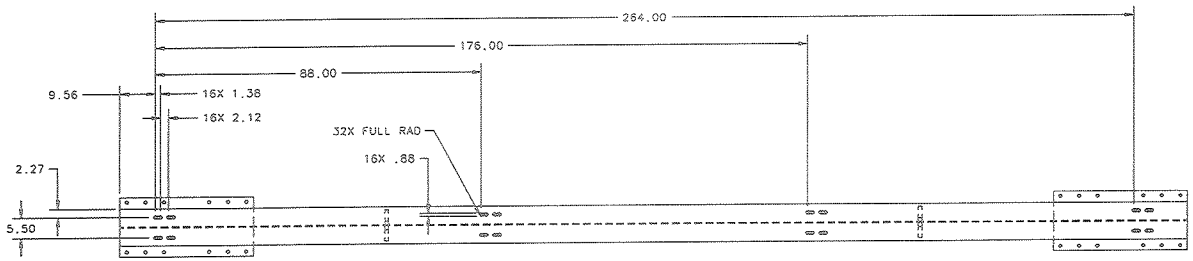
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/16	9210.300-ME-328374	1 OF 1	

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	ITEM 4 ADDED ; ITEM 2 QTY. WAS 4 NOW 2.	G SMITH	2/15/96









ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
4	MB-328403	LIFTING LUG #2	2
3	FERMI # 1530-2170	FLAT, RECTANGULAR, STEEL, AISI 1018 1 X 4 X 12.62 LG.	4
2	MB-328385	LIFTING LUG	2
1	COML (EXISTING)	STEEL WIDE FLANGE BEAM ASTM A 36 W14 X 68 (EXISTING)	1

PARTS LIST

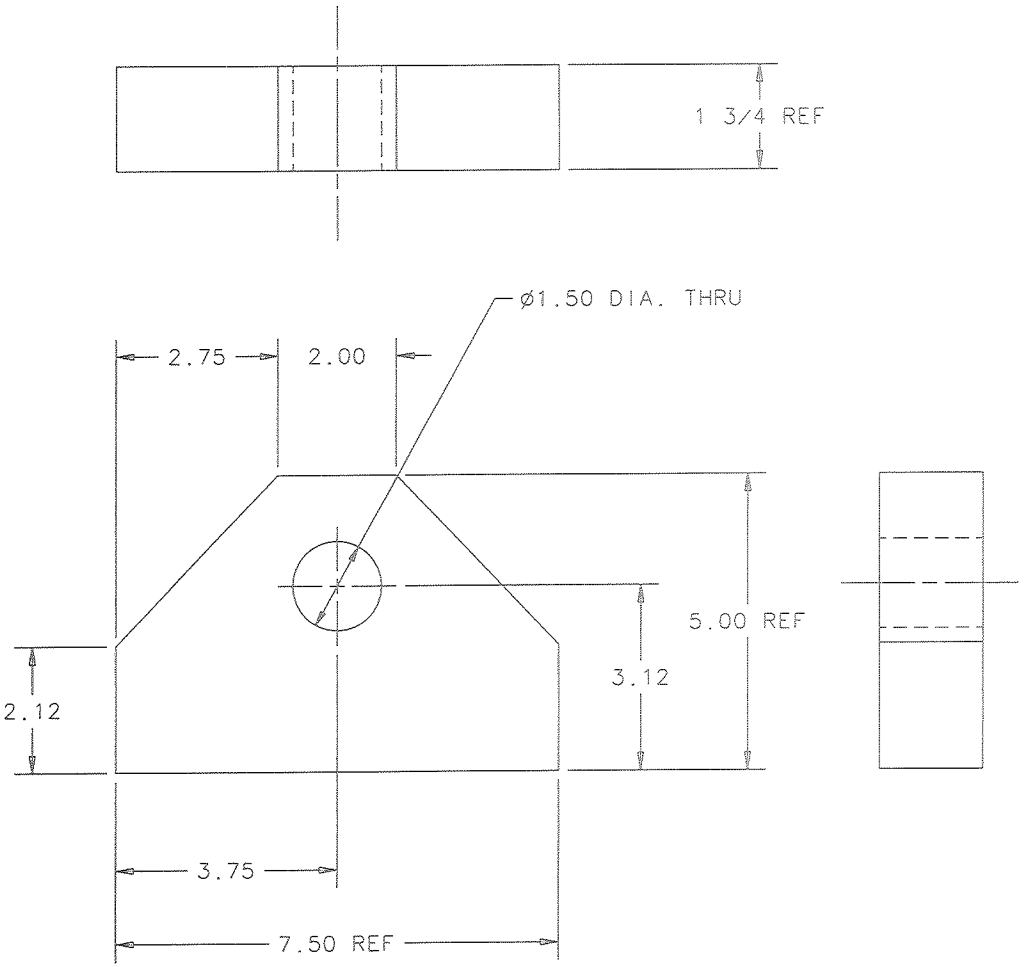
UNLESS OTHERWISE SPECIFIED	ORIGINATOR	DON MITCHELL 2/7/96
XX .XXX ANGLES	DRAWN	G SMITH 2/9/96
± .03 ± — ± —	CHECKED	C NILA 2/9/96
1. BREAK ALL SHARP EDGES .015 MAX. 2. DO NOT SCALE DRWG 3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S. 4. ALL DIMENSIONS ARE IN INCHES.	APPROVED	DONALD V.MITCHELL 2/9/96
	USED ON	3210.300-ME-328364 3210.300-ME-328365
125 MAX ALL MACHINED SURFACES	MATERIAL	LISTED

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
BEAM WELDMENT

SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	3210.300-MD-328386	1 OF 1	A

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	5.00" DIM. WAS 4.37	G SMITH	2/12/96



ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/7/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/8/96
± .03	± ——	± ——	CHECKED	C NILA	2/9/96
			APPROVED	DONALD V.MITCHELL	2/9/96

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 √ MAX. ALL MACHINED SURFACES

USED ON: 3210.300-ME-328386

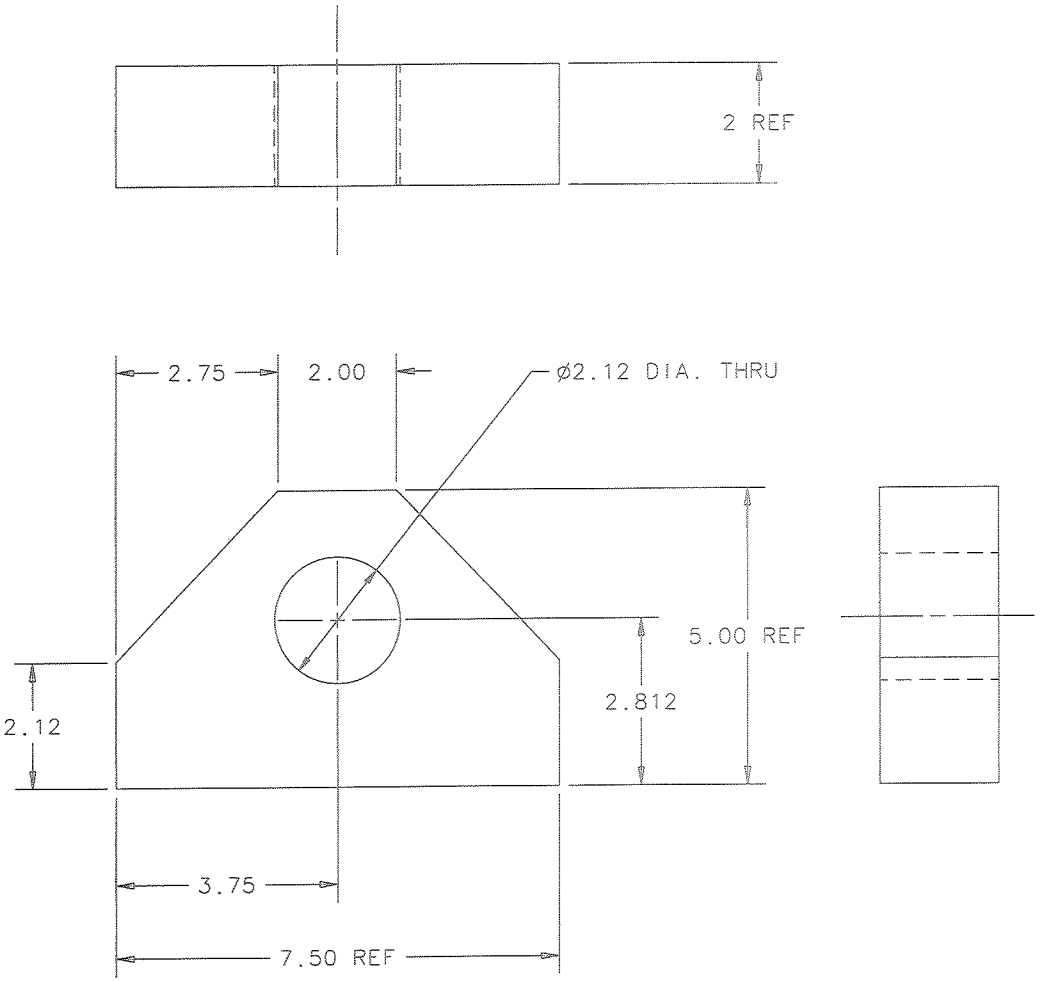
MATERIAL: STEEL PLATE ASTM A 36 1 3/4 X 5.00 X 7.50-COML

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
LIFTING LUG

SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	3210.300-MB-328385	1 OF 1	A

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/7/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/15/96
± .03	±.010	± ——	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 √ MAX. ALL MACHINED SURFACES

USED ON: 3210.300-ME-328386

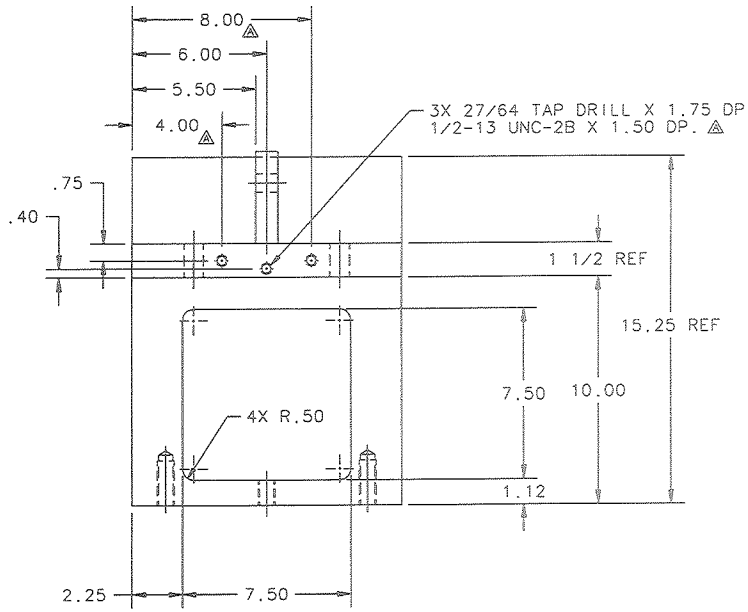
MATERIAL: STEEL PLATE ASTM A 36 2.0 X 5.00 X 7.50-COML

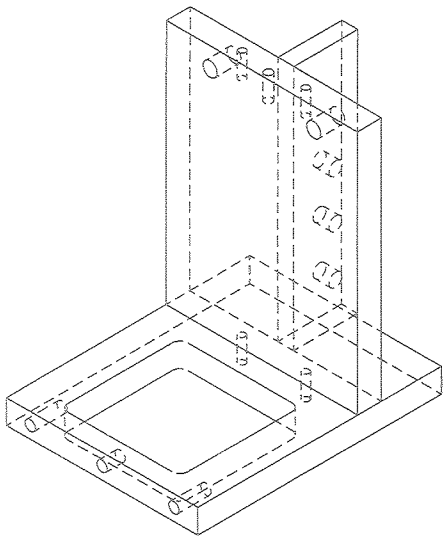
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

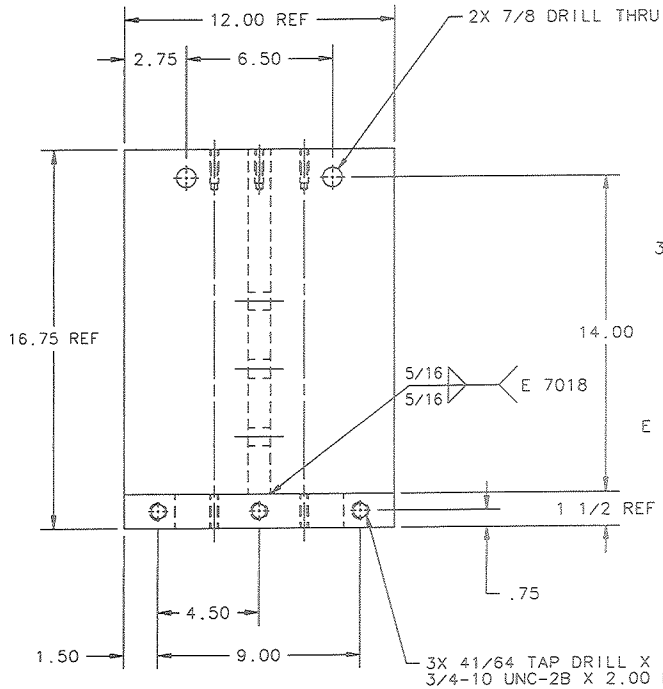
RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
LIFTING LUG #2

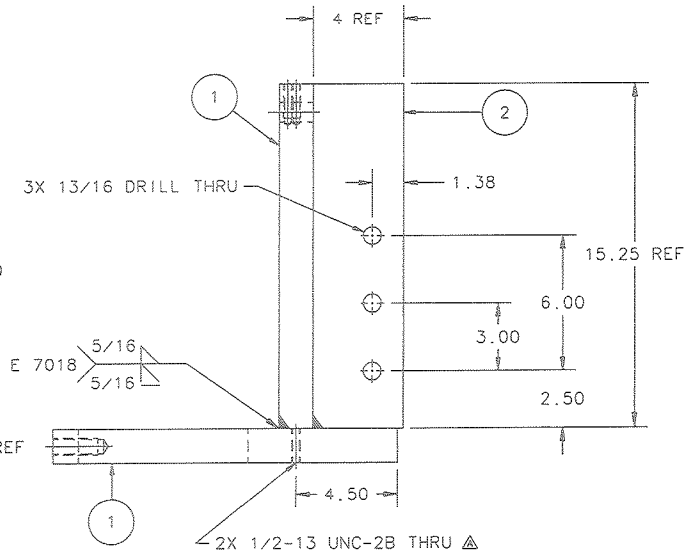
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	3210.300-MB-328403	1 OF 1	

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	ADDED 4, 1/2-13 UNC TAPPED HOLES	D. MITCHELL	2/15/96









WEIGHT 150 LBS.
(STENCIL ON BRACKET)

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
2	1530-2170	FLAT,RECTANGLE,AISI 1018 C.D.STEEL 1 X 4 X 15.25 LG.	1
1	1534-2100	PLATE,HOT ROLLED STEEL,LOW CARBON 1 1/2 X 12.00 X 15.25 LG.	2

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/6/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/7/96
± .03	± ——	± ——	CHECKED	C. NILA	2/7/96
			APPROVED	DONALD V. MITCHELL	2/8/96

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 MAX. ALL MACHINED SURFACES

USED ON
9210.300-ME-328364
9210.300-ME-328365

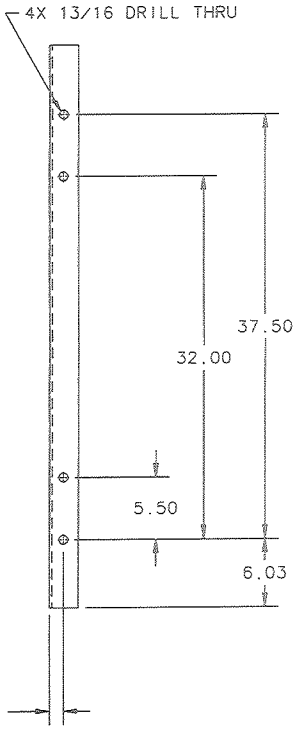
MATERIAL
LISTED

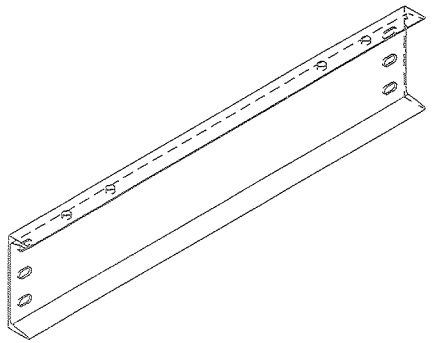
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

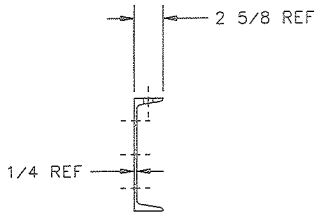
RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE
"L" BRACKET WELDMENT

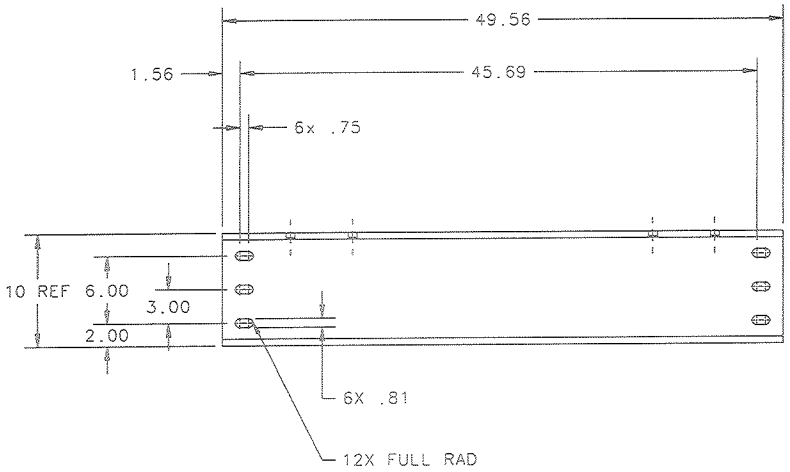
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/4	9210.300-MC-328366	1 OF 1	A

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE









ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	D MITCHELL	2/7/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/8/96
± .03	± —	± —	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 MAX. ALL MACHINED SURFACES

USED ON
9210.300-ME-328364
9210.300-ME-328365

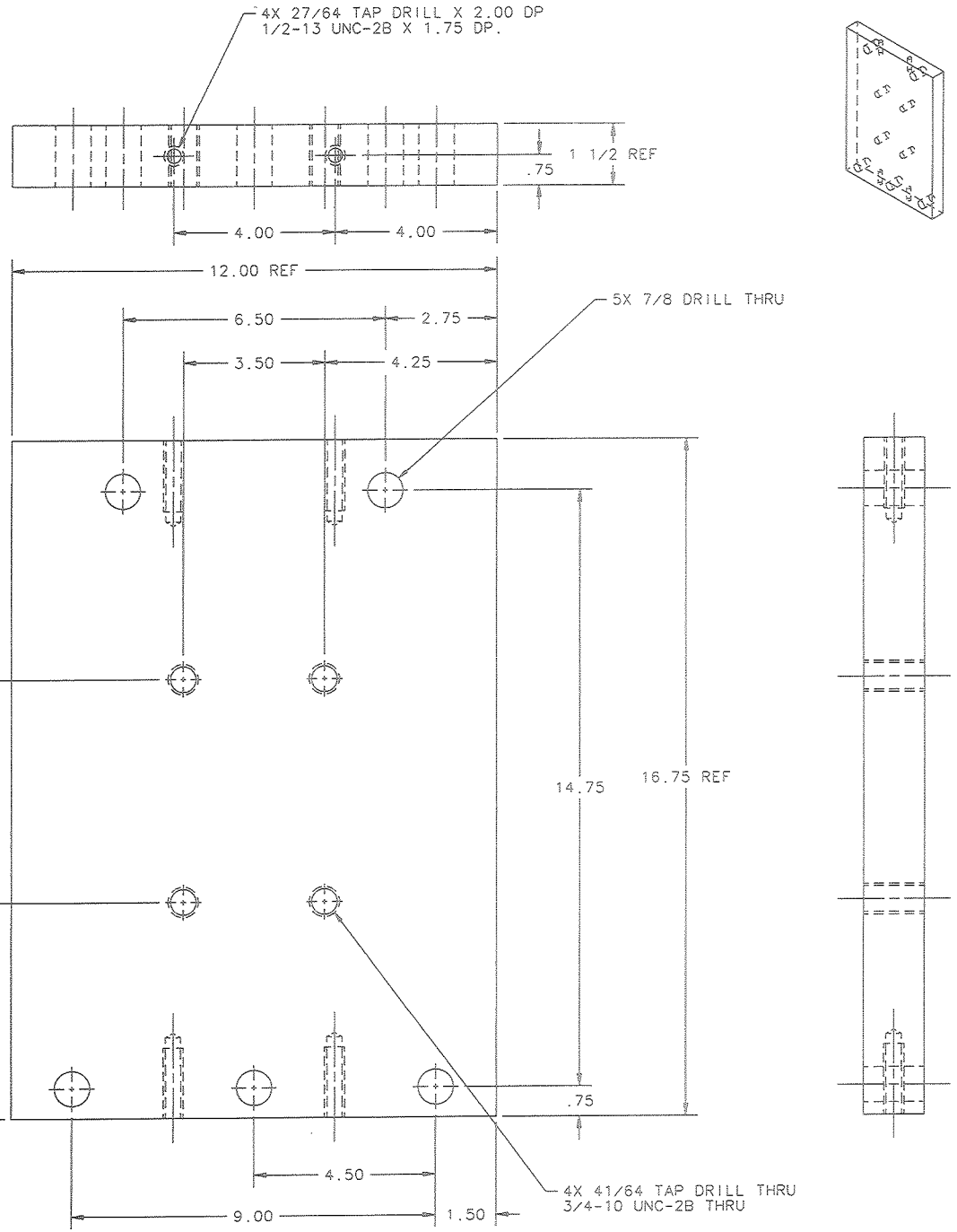
MATERIAL C10 X 5.28 ALUMINUM CHANNEL AMERICAN STANDARD 6061-T6 FERMI #1510-1070

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MMECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
CHANNEL CROSS SECTION

SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/8	9210.300-MC-328373	1 OF 1	

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	(4) 1/2-13 TAPPED HOLES ADDED	G SMITH	2/15/96



ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/6/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/7/96
± .03	± —	± —	CHECKED	C NILA	2/7/96
			APPROVED	DONALD V. MITCHELL	2/8/96

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 √ MAX. ALL MACHINED SURFACES

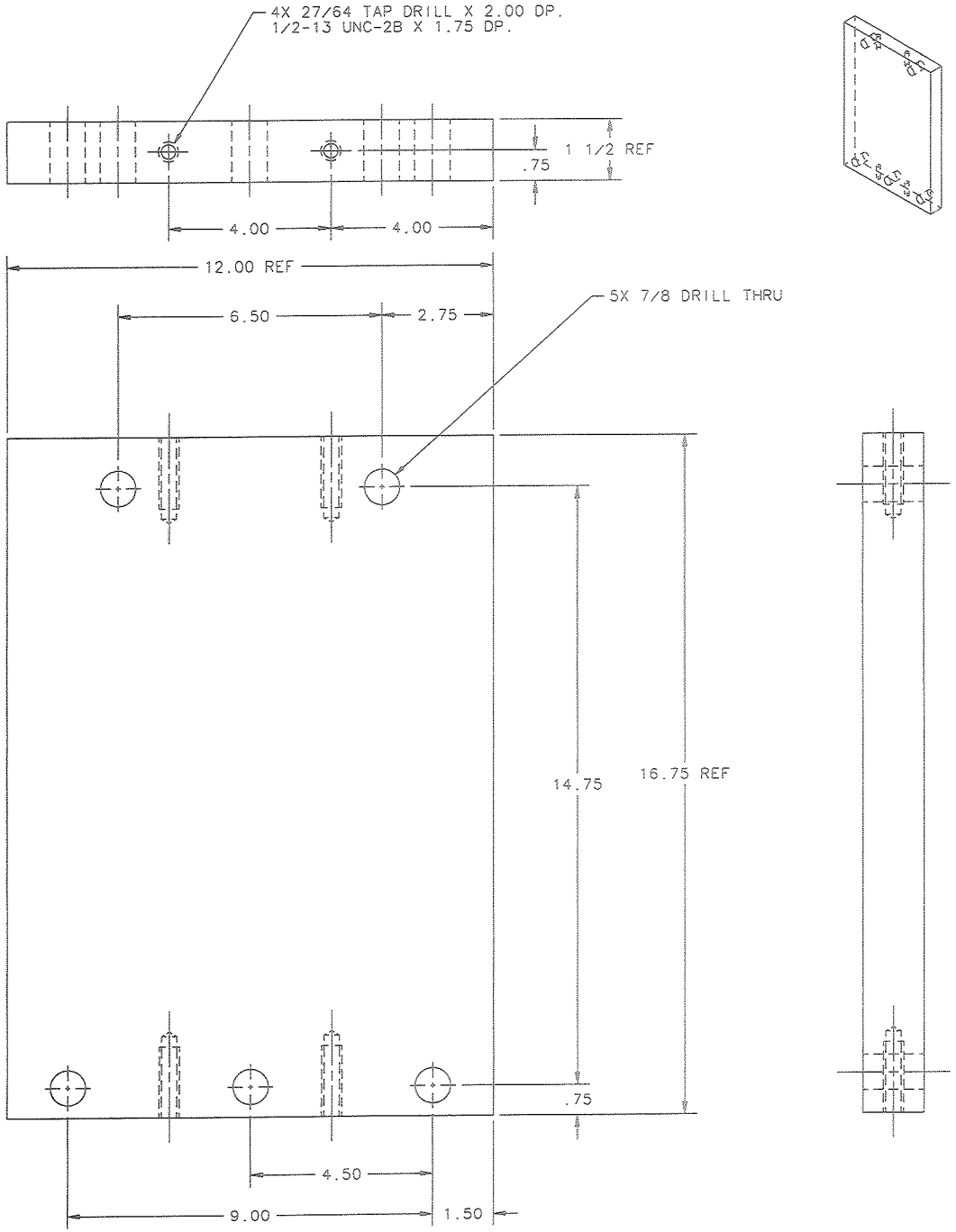
USED ON
9210.300-ME-328364
9210.300-ME-328365

MATERIAL
PLATE, HOT ROLLED STEEL, LOW CARBON
1 1/2 X 12.00 X 16.75 LG. FERMI #1534-2100

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
CLAMP PLATE 1

SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	9210.300-MC-328374	1 OF 1	A



REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE
A	(4) 1/2-13 TAPPED HOLES ADDED	G SMITH	2/15/96

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/6/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/7/96
± .03	± ——	± ——	CHECKED	C NILA	2/7/96
			APPROVED	DONALD V.MITCHELL	2/8/96

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 √ MAX. ALL MACHINED SURFACES

USED ON
9210.300-ME-328364
9210.300-ME-328365

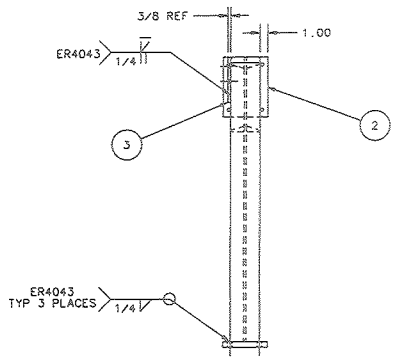
MATERIAL
PLATE,HOT ROLLED STEEL,LOW CARBON
1 1/2 X 12.00 X 16.75 LG. FERMI #1534-2100

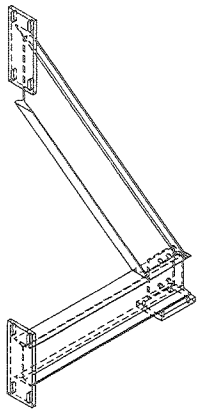
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

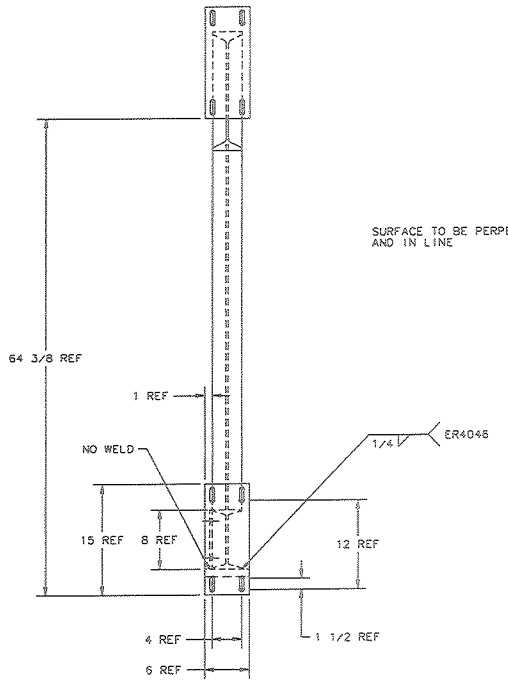
RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
CLAMP PLATE 2

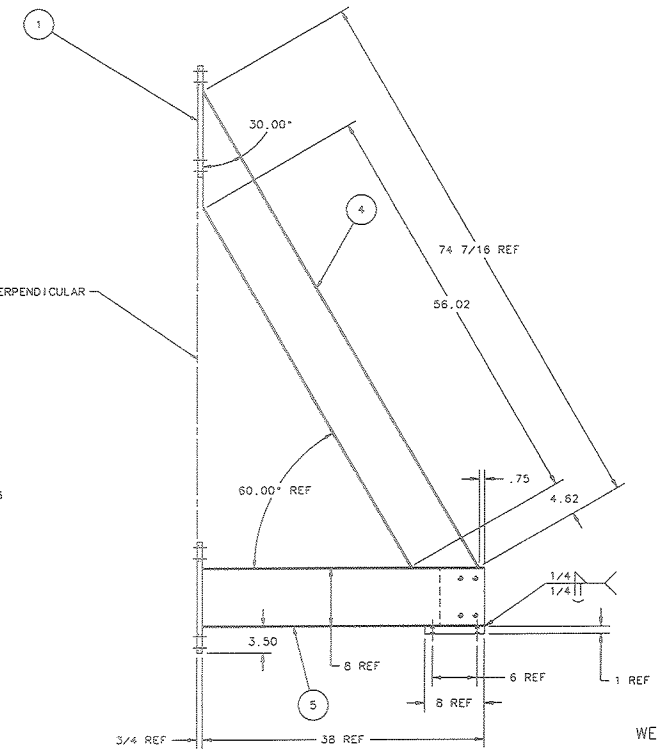
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	9210.300-MC-328375	1 OF 1	A

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE









WEIGHT = 77 LBS.

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
5	COML	ALUM BEAM 6061-T6 8 X 6.35 #/FT. X 38.00" LG.	1
4	COML	ALUM BEAM 6061-T6 8 X 6.35 #/FT. X 74.00" LG.	1
3	MB-328411	STABILIZER PLATE	1
2	MB-328410	CASTER PLATE	1
1	MB-328406	OUTRIGGER PLATE	2

PARTS LIST

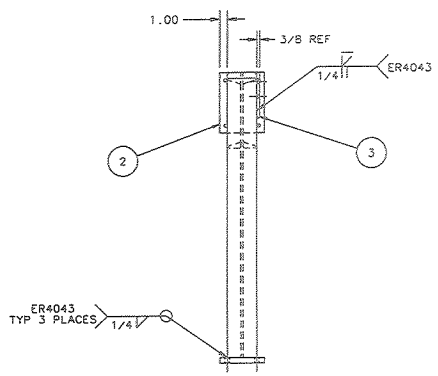
UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/16/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/17/96
± .03	± ——	± ——	CHECKED		
1. BREAK ALL SHARP EDGES .010 MAX. 2. DO NOT SCALE DRWG. 3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S. 4. ALL DIMENSIONS ARE IN INCHES.			APPROVED		
			USED ON	3210.300-ME-328364	
125 MAX. ALL MACHINED SURFACES			MATERIAL	LISTED	

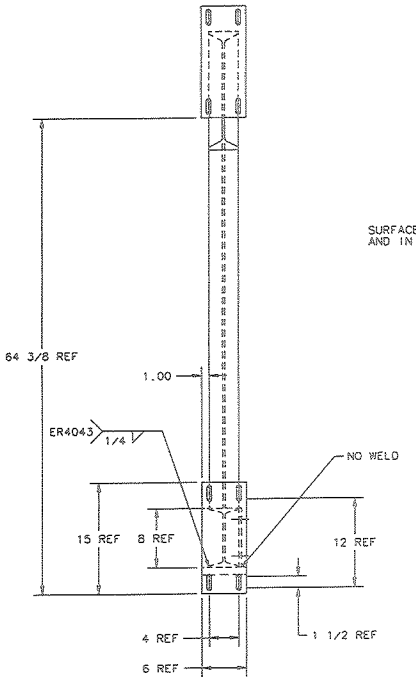
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

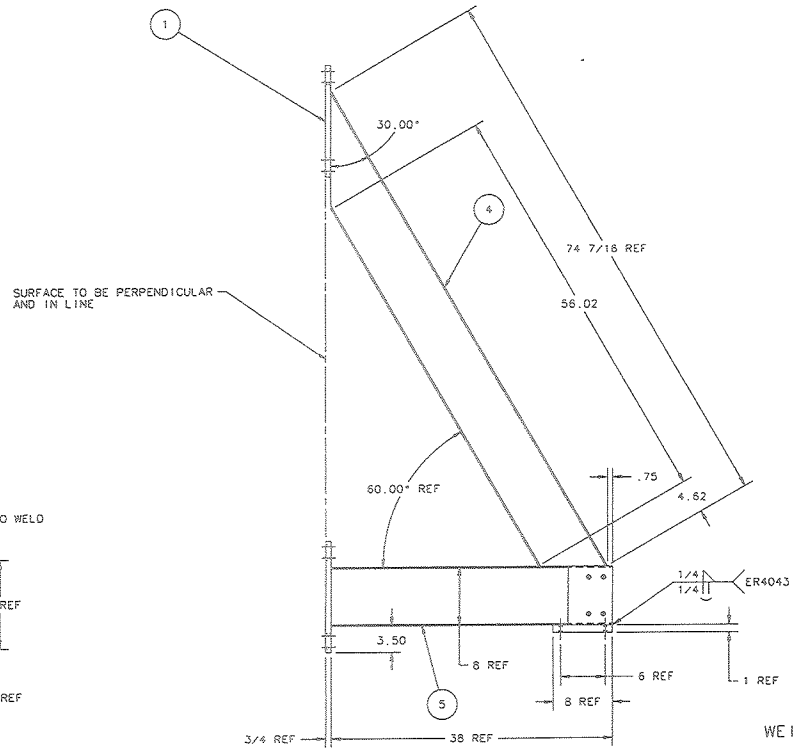
RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
OUTRIGGER WELDMENT #1

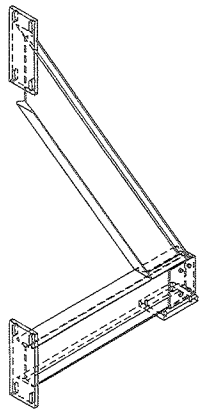
SCALE	DRAWING NUMBER	SHEET NO.	REV
1/8	3210.300-MD-328413	1 OF 1	

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE









WEIGHT = 77 LBS.

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
5	COML	ALUM BEAM 6061-T6 8 X 6.35 #/FT. X 38.00" LG.	1
4	COML	ALUM BEAM 6061-T6 8 X 6.35 #/FT. X 77.44" LG.	1
3	MB-328411	STABILIZER PLATE	1
2	MB-328410	CASTER PLATE	1
1	MB-328406	OUTRIGGER PLATE	2

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/16/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/17/96
±.03	± —	± —	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S
4. ALL DIMENSIONS ARE IN INCHES.

125 MAX ALL MACHINED SURFACES

USED ON: 3210.300-ME-328364

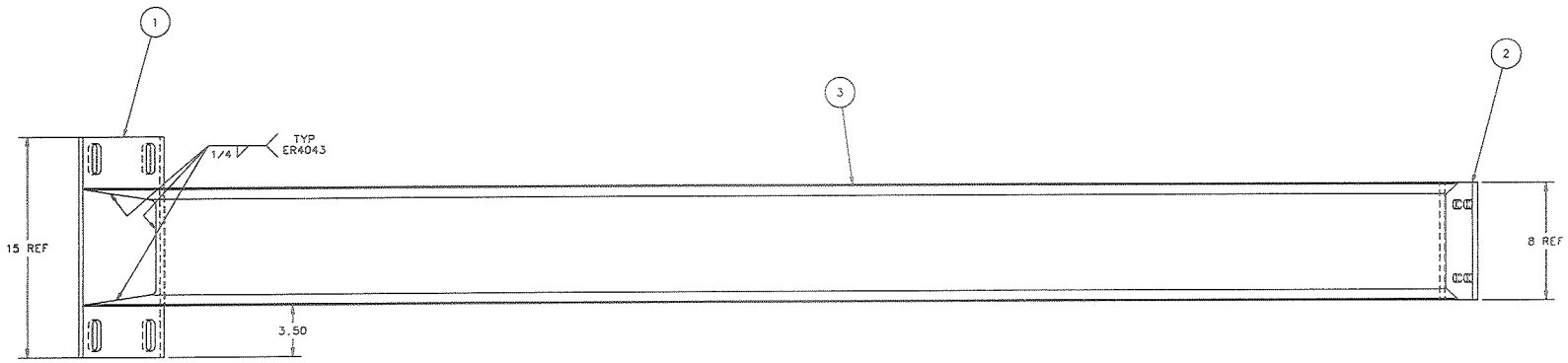
MATERIAL: LISTED

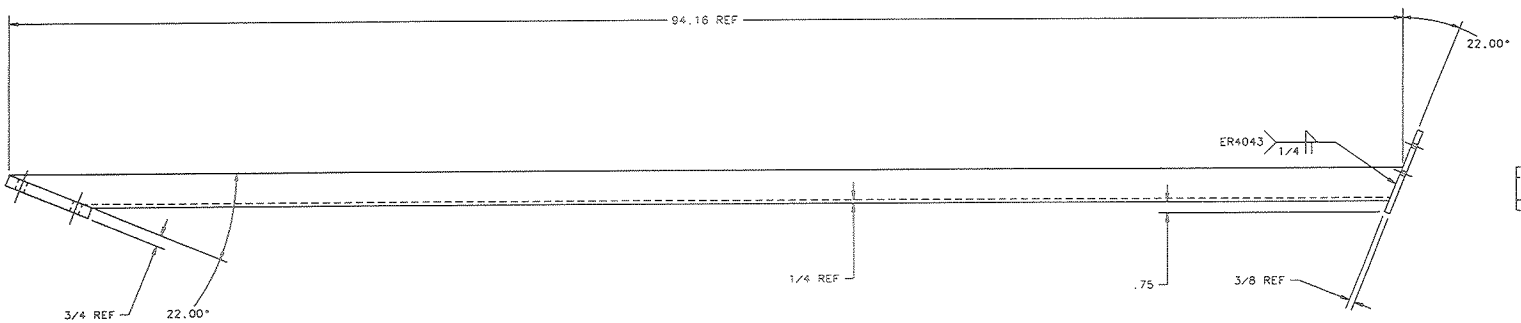
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

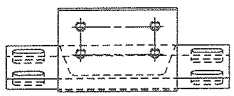
RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
OUTRIGGER WELDMENT #2

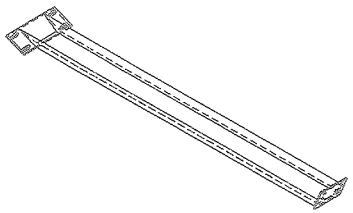
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/8	3210.300-MD-328414	1 OF 1	

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE









WEIGHT = 42 LBS

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.
3	1510-1060	ALUM CHANNEL-6061-T6 8 X 4.25 #/FT. X 94.16"LG.	1
2	MB-328411	STABALIZER PLATE	1
1	MB-328406	OUTRIGGER PLATE	1

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/16/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/17/96
± .03	± —	± —	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 MAX. ALL MACHINED SURFACES

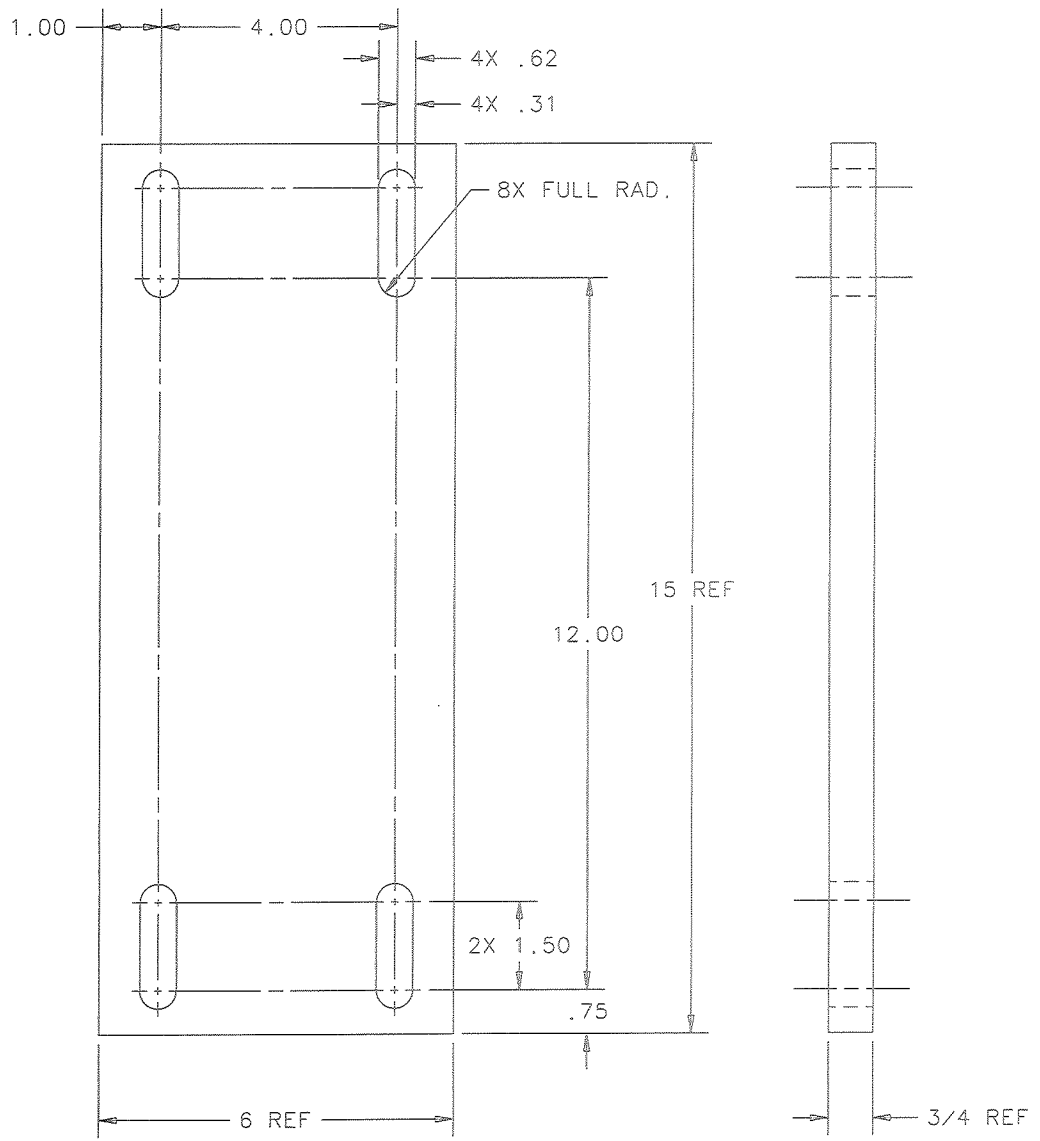
USED ON: 3210.300-MC-328364

MATERIAL: LISTED

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
STABLIZER ARM

SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/4	3210.300-MD-328412	1 OF 1	



REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE

ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	D MITCHELL	2/15/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/16/96
± .03	± ——	± ——	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 MAX. ALL MACHINED SURFACES

USED ON: 9210.300-ME-328364

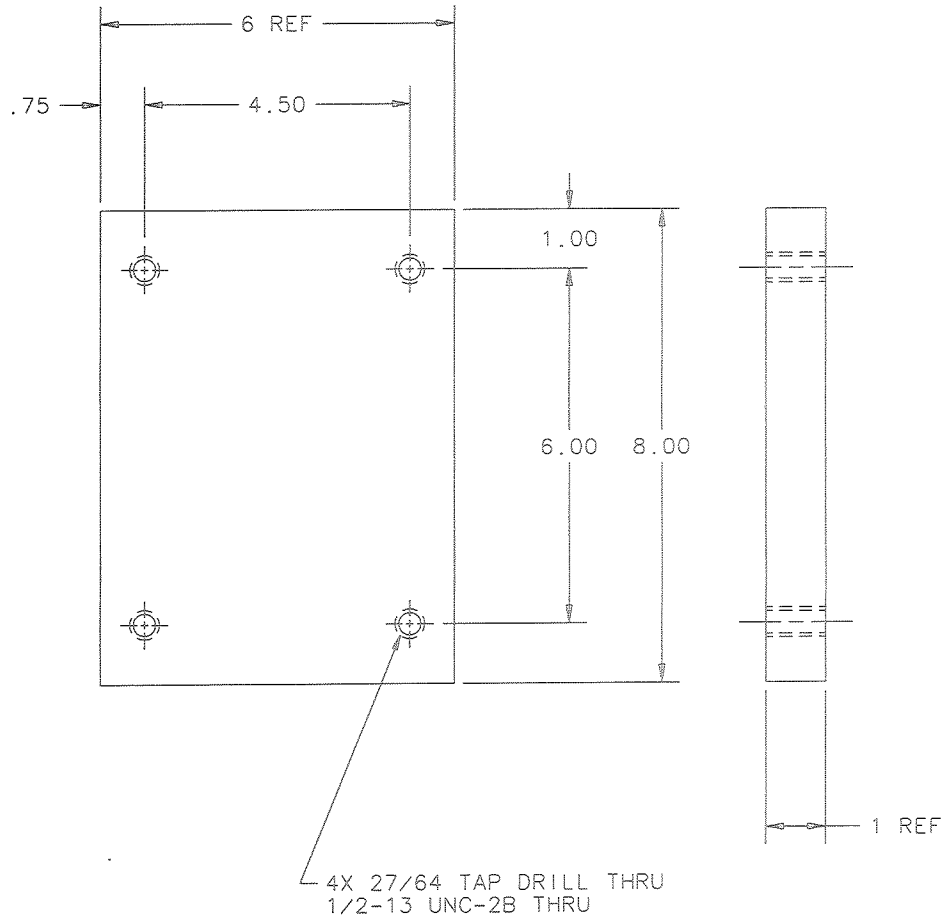
MATERIAL: ALUM RECTANGLE 6061-T6 3/4 X 6 X 15.00 LG. FERMI #1510-2250

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
OUTRIGGER PLATE

SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	9210.300-MB-328406	1 OF 1	

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/16/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/16/96
± .03	± ——	± ——	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 √ MAX. ALL MACHINED SURFACES

USED ON: 9210.300-ME-328364

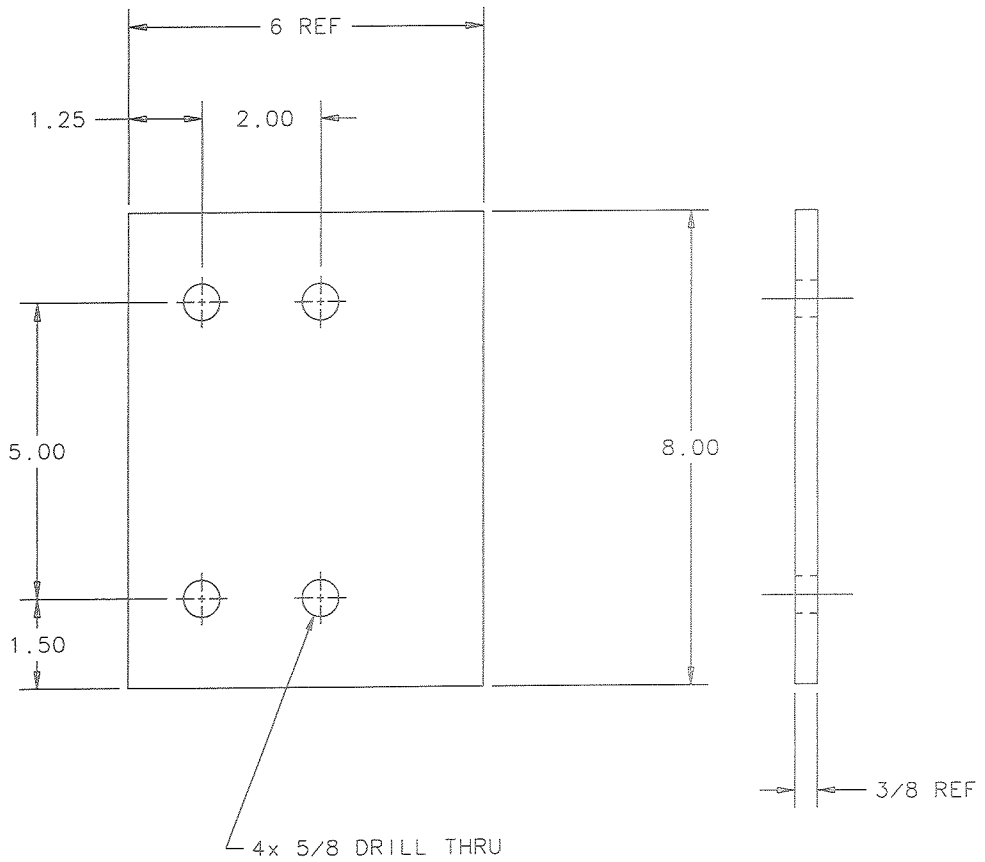
MATERIAL: ALUM RECTANGLE-6061-T6
1 X 6 X 8.00 LG.
FERMI #1510-2360

FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
CASTER PLATE

SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	9210.300-MB-328410	1 OF 1	

REV.	DESCRIPTION	DRAWN	DATE
		APPROVED	DATE



ITEM NO.	PART NO.	DESCRIPTION OR SIZE	QTY. REQ.

PARTS LIST

UNLESS OTHERWISE SPECIFIED			ORIGINATOR	DON MITCHELL	2/16/96
.XX	.XXX	ANGLES	DRAWN	G SMITH	2/16/96
± .03	± ——	± ——	CHECKED		
			APPROVED		

1. BREAK ALL SHARP EDGES .015 MAX.
2. DO NOT SCALE DRWG.
3. DIMENSIONING IN ACCORD WITH ANSI Y14.5M-1982 STD'S.
4. ALL DIMENSIONS ARE IN INCHES.

125 √ MAX. ALL MACHINED SURFACES

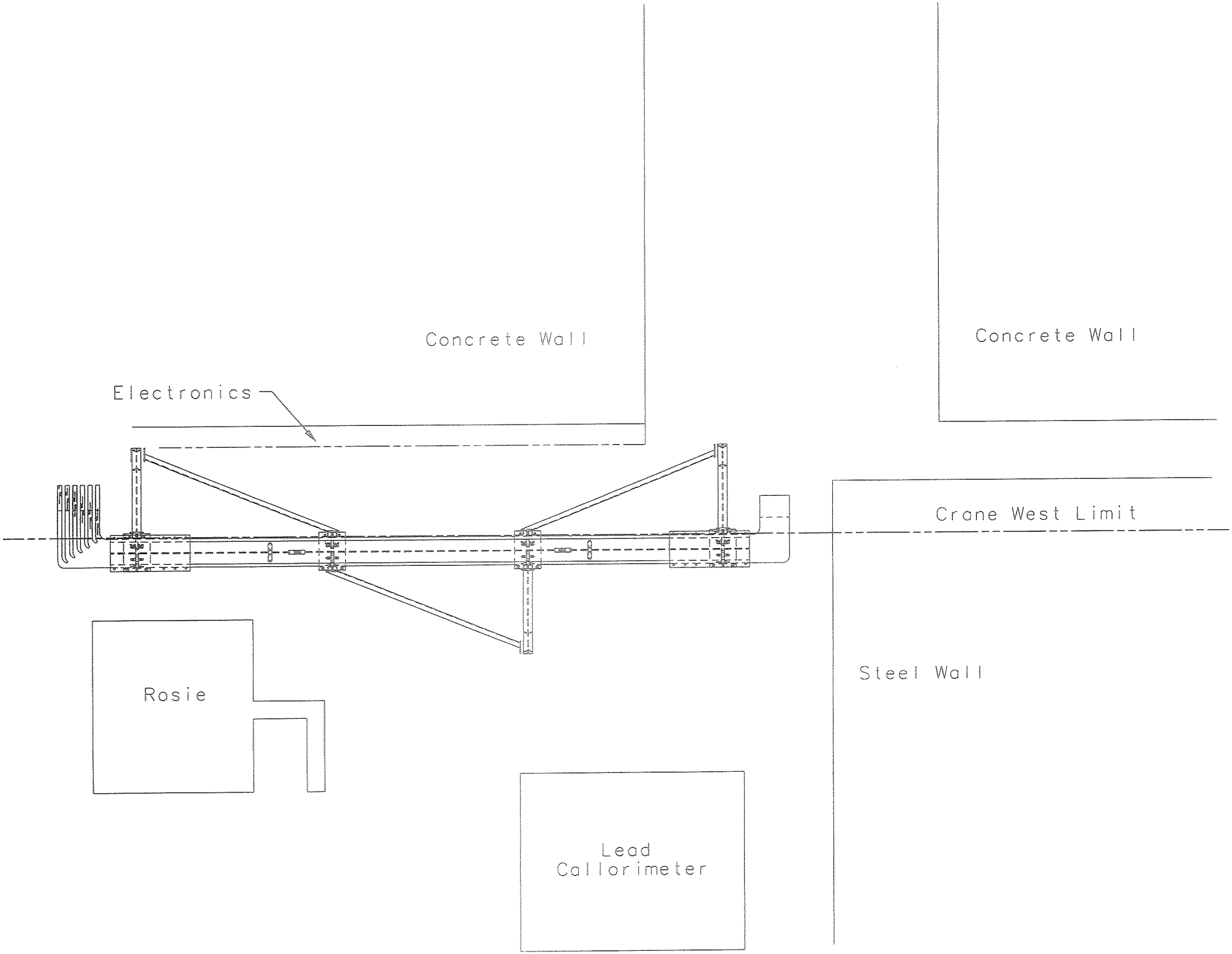
USED ON: 9210.300-ME-328364

MATERIAL: ALUM RECTANGLE-6061-T6 3/8 X 6 X 8.00 LG. FERMI #1510-1920

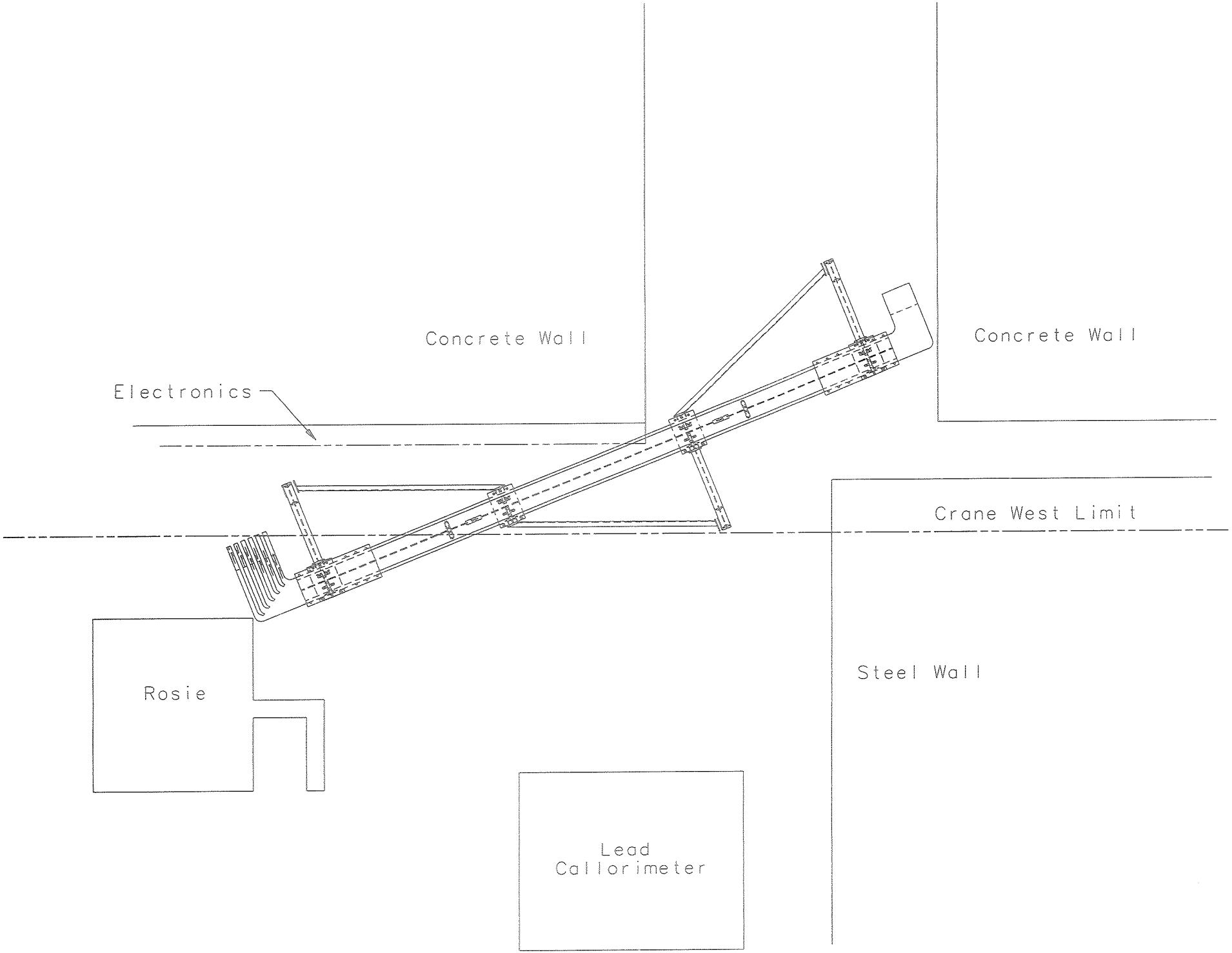
FERMI NATIONAL ACCELERATOR LABORATORY
UNITED STATES DEPARTMENT OF ENERGY

RD/MECHANICAL SUPPORT DEPT.
SELMA MAGNET COIL LIFTING FIXTURE E872
STABILIZER PLATE

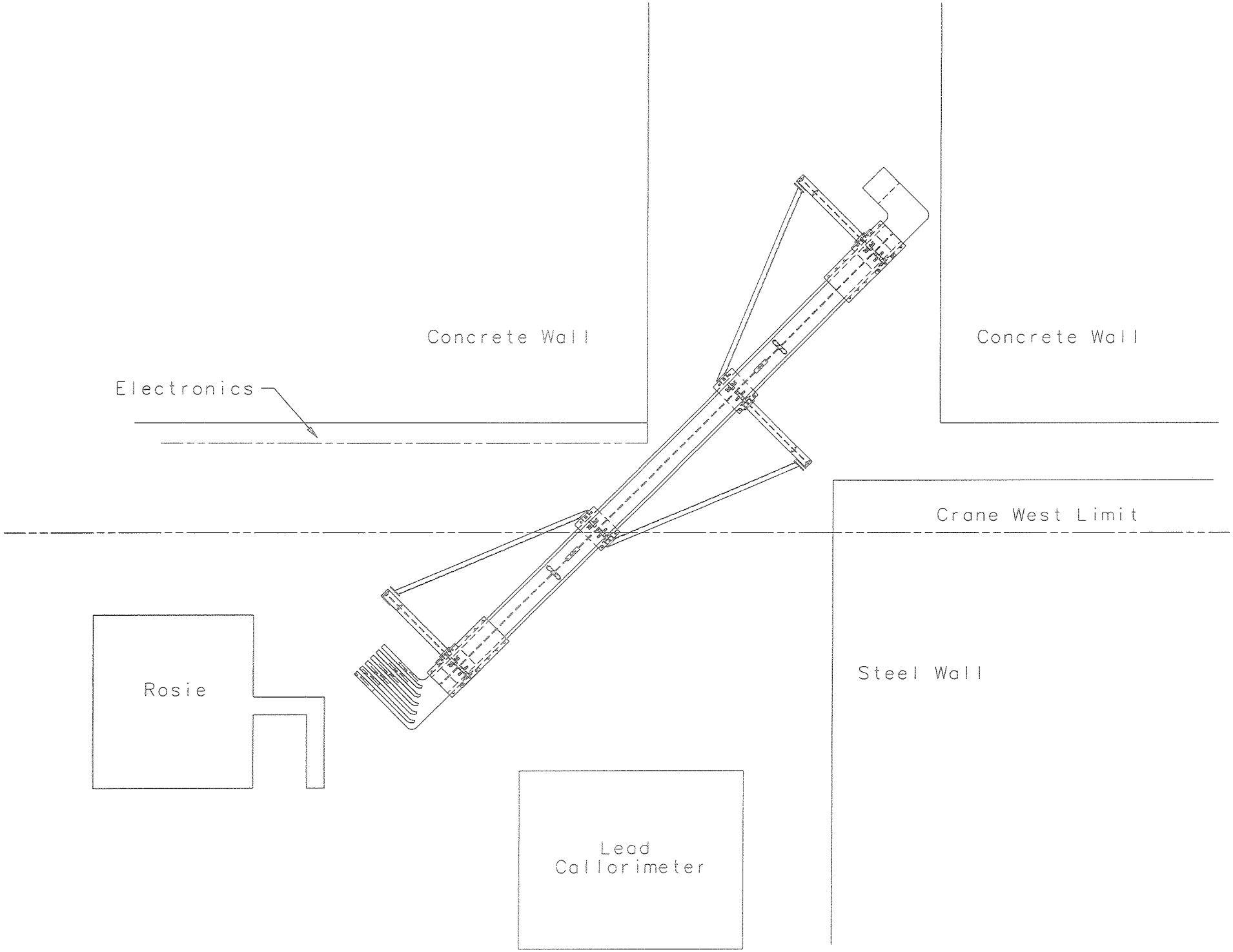
SCALE	DRAWING NUMBER	SHEET NO.	REV.
1/2	9210.300-MB-328411	1 OF 1	



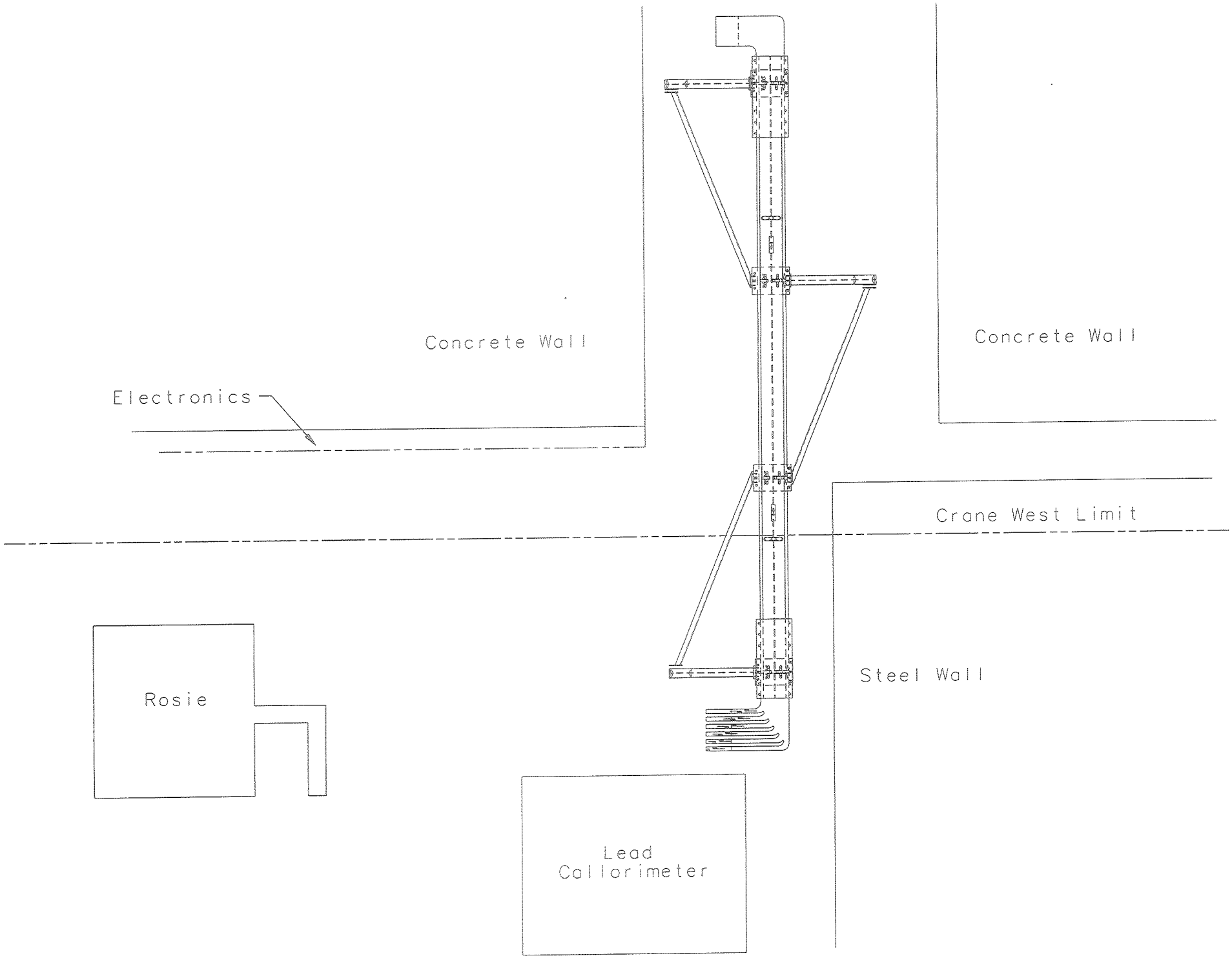
Plotted by dmitchel on 22-Feb-96 , File: building_fit1.pff



Plotted by dmitchel on 22-Feb-96 , File: building_fit7.pff



Plotted by dmitchel on 22-Feb-96 , File: building_fit12.pff



Plotted by dmitchel on 22-Feb-96 , File: building_fit18.pff