Basic Crane Design and Stress Analysis

Appendix: Figures

Course No: M03-055
Credit: 3 PDH

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ROTATION TEST


ROTATION SLEW,WORM GEAR DRIVE


FINAL
LOAD
TEST

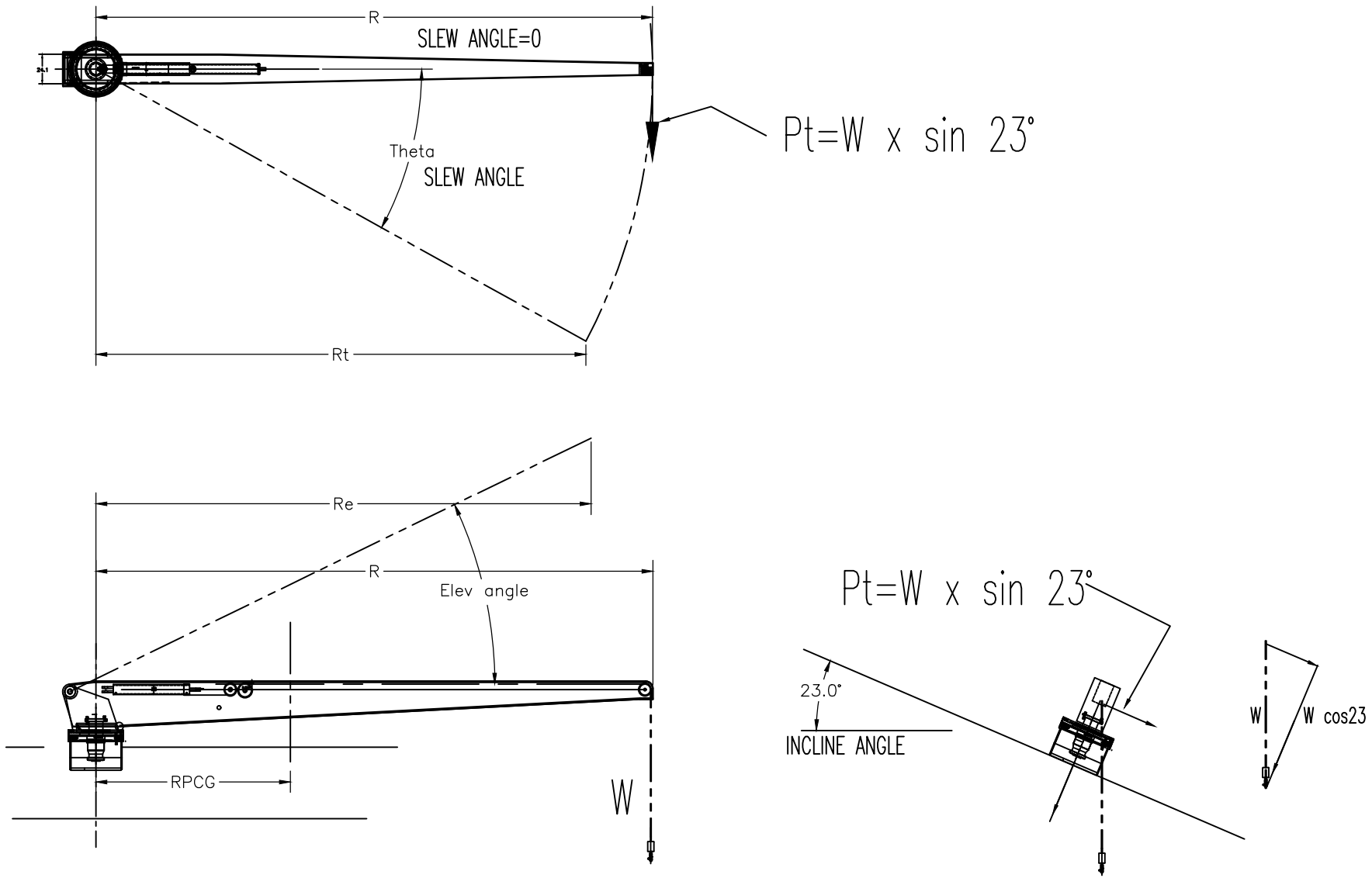


FIG M1.0–A CRANE ROTATIONAL TORQUE

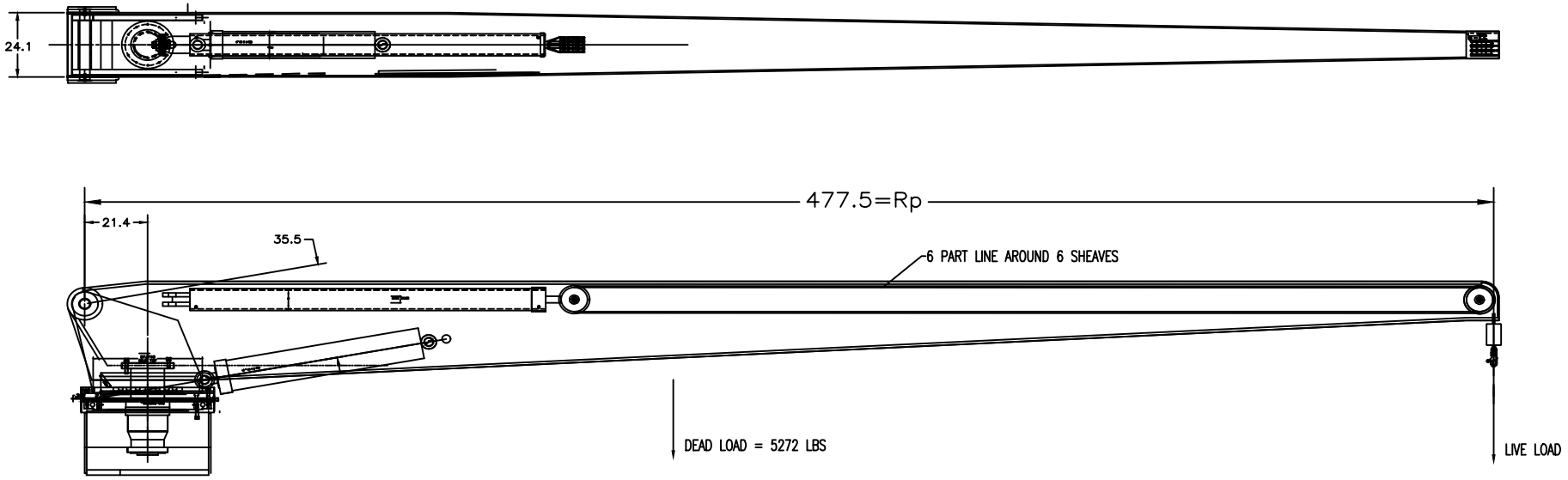


FIG M2.0–A BOOM and CABLE CYLINDER

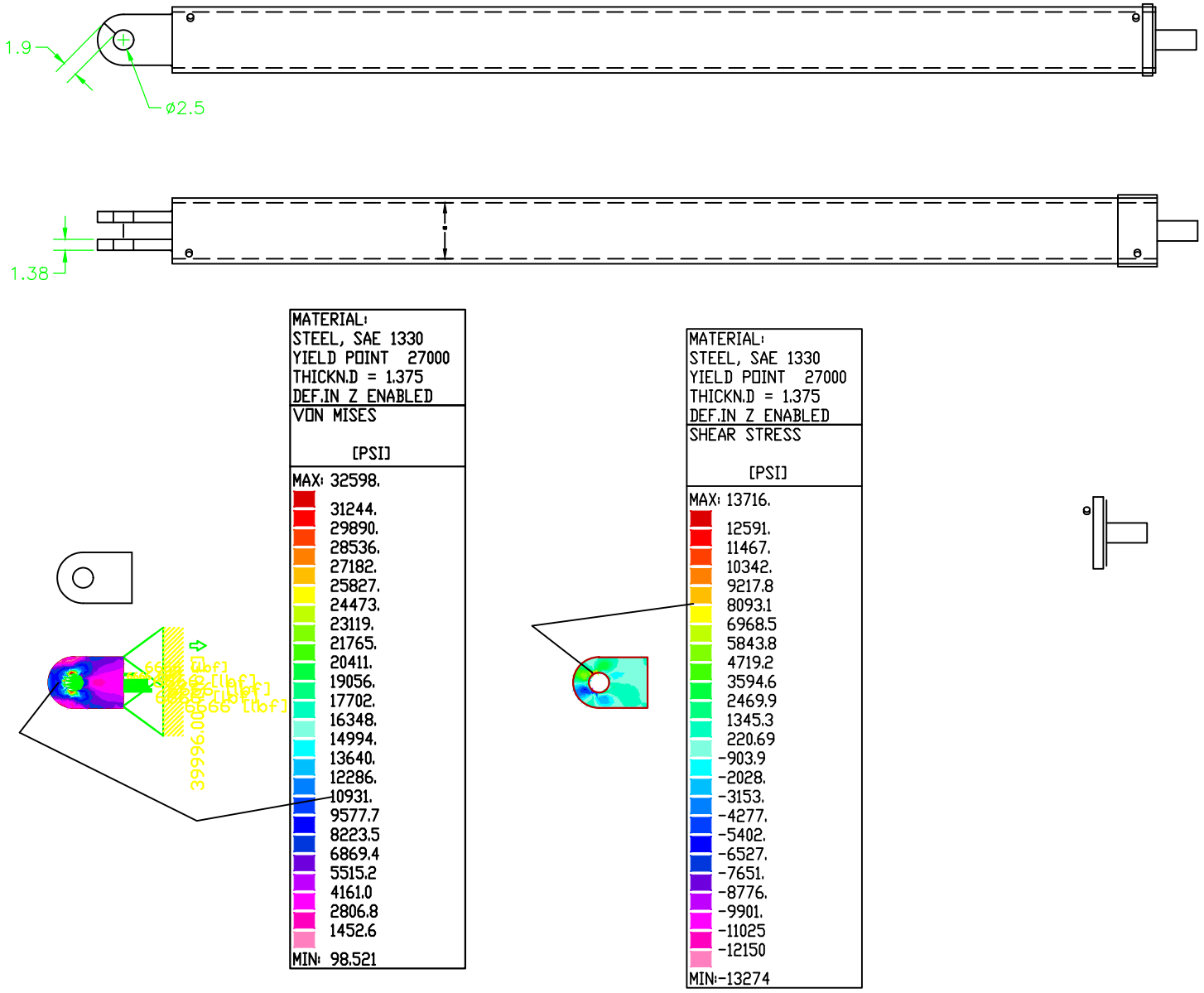


FIG M3.2–A CABLE CYLNDER

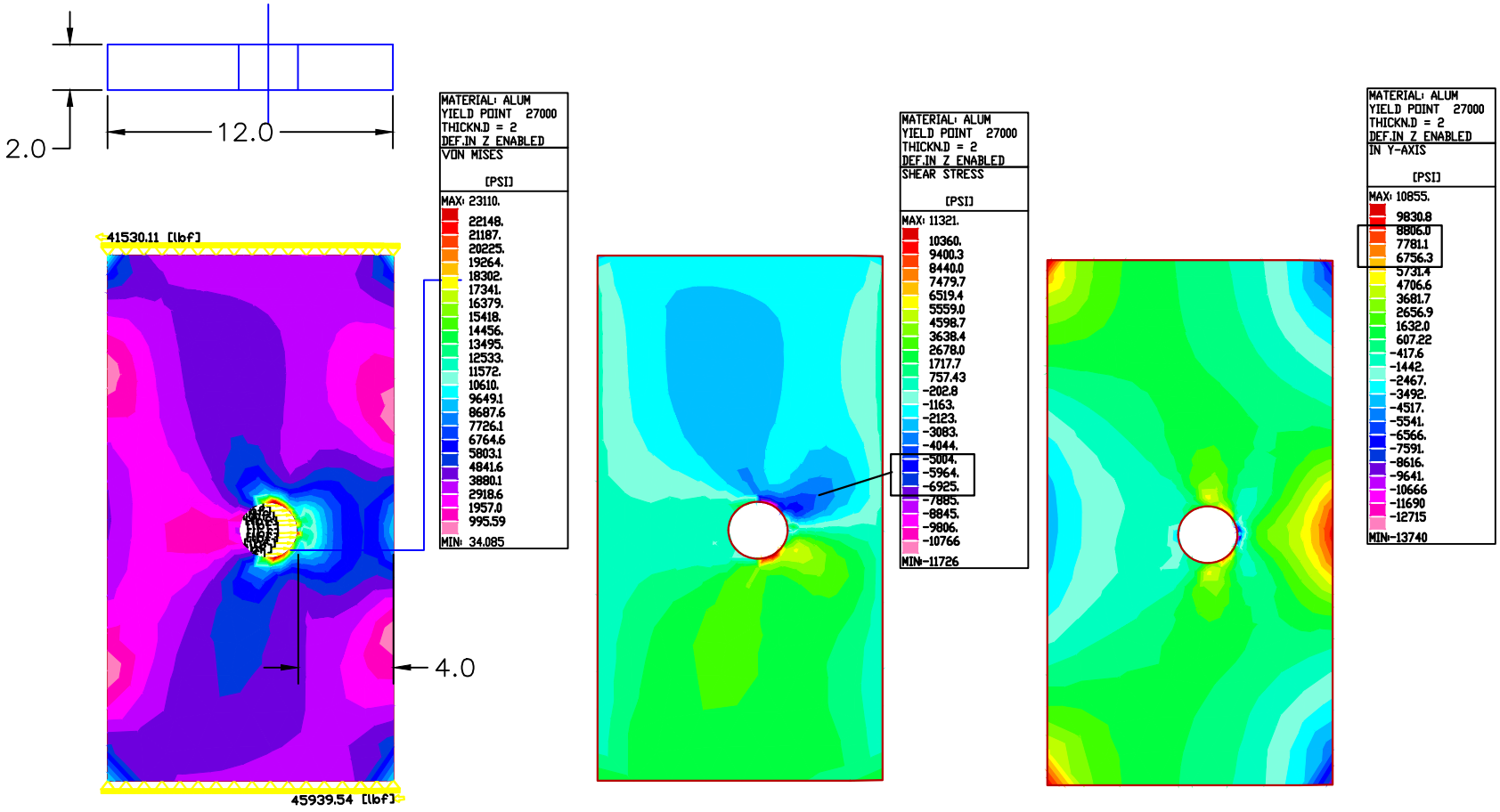


FIG M3.2–B
CABLE CYLNDER MOUNT

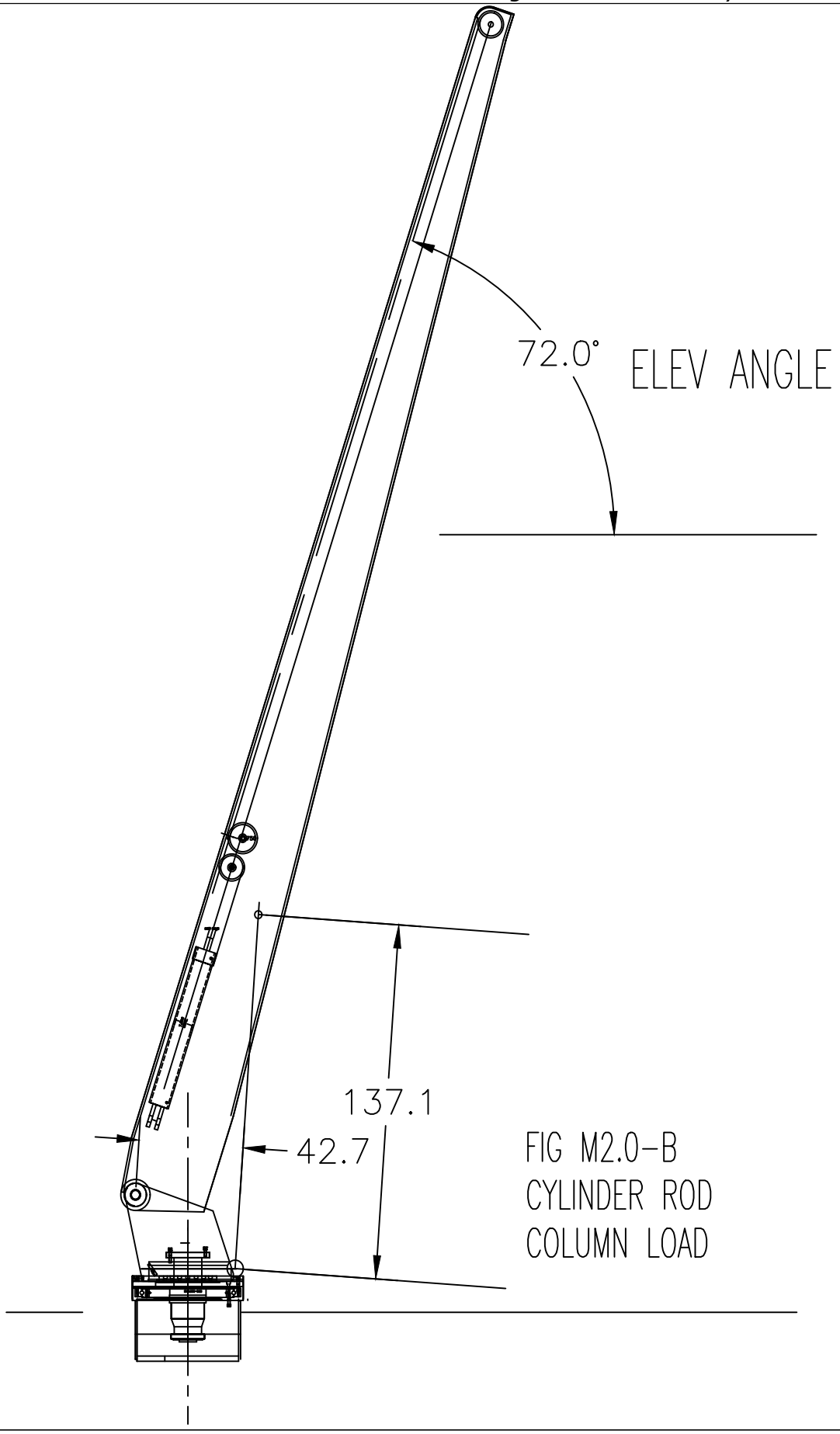
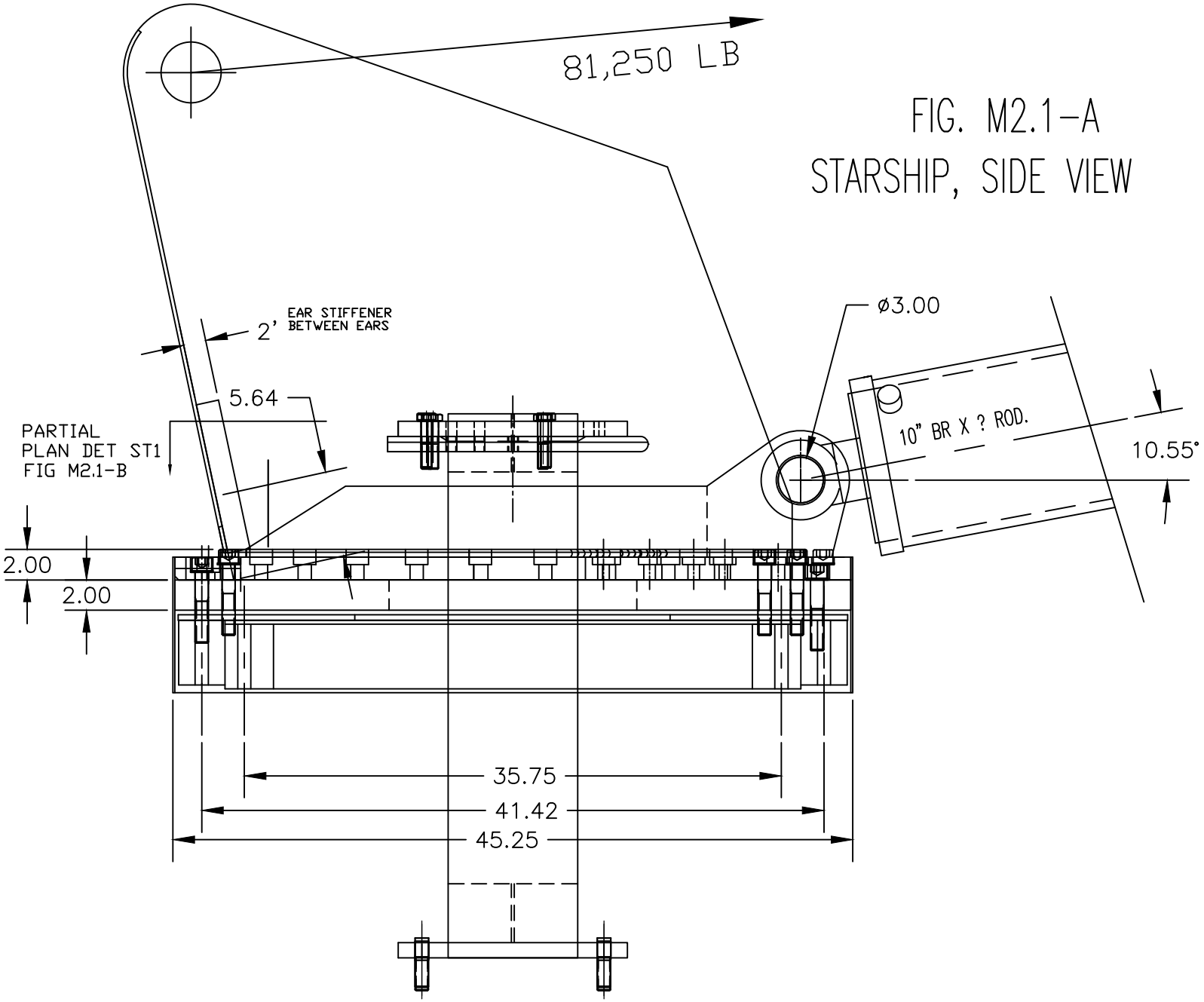
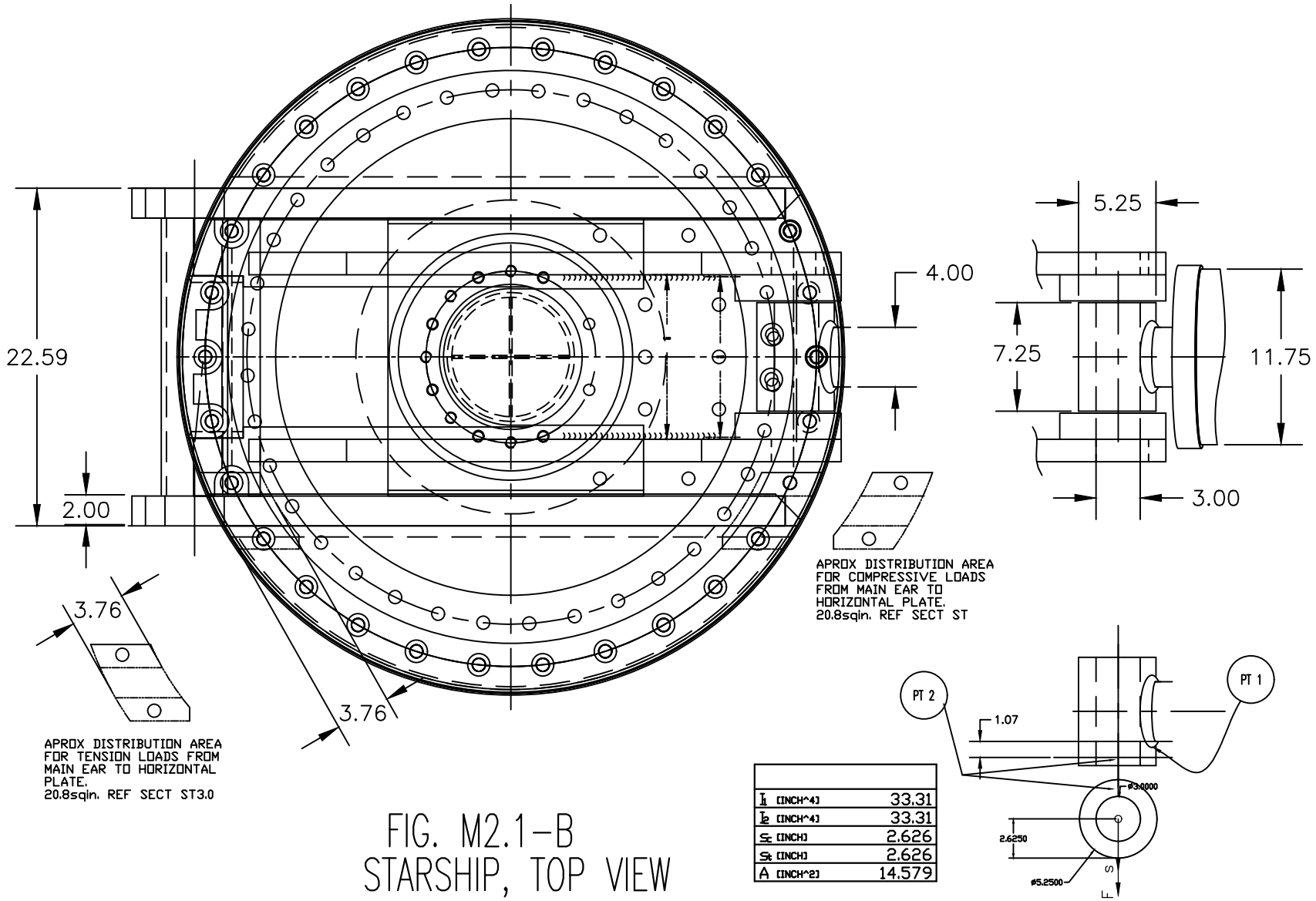


FIG M2.0-B
CYLINDER ROD
COLUMN LOAD


81,250 LB
FIG. M2.1-A
STARSHIP, SIDE VIEW
2' EAR STIFFENER BETWEEN EARS
5.64
PARTIAL PLAN DET ST1 FIG M2.1-B
ø3.00
10" BR X ? ROD.
10.55°
2.00
2.00
35.75
41.42
45.25



I_1 [INCH^4]	33.31
I_2 [INCH^4]	33.31
S_c [INCH]	2.626
S_t [INCH]	2.626
A [INCH^2]	14.579

FIG. M2.1-B
STARSHIP, TOP VIEW

FIG M2.1–C
BOOM CYLD TUBE ROD END

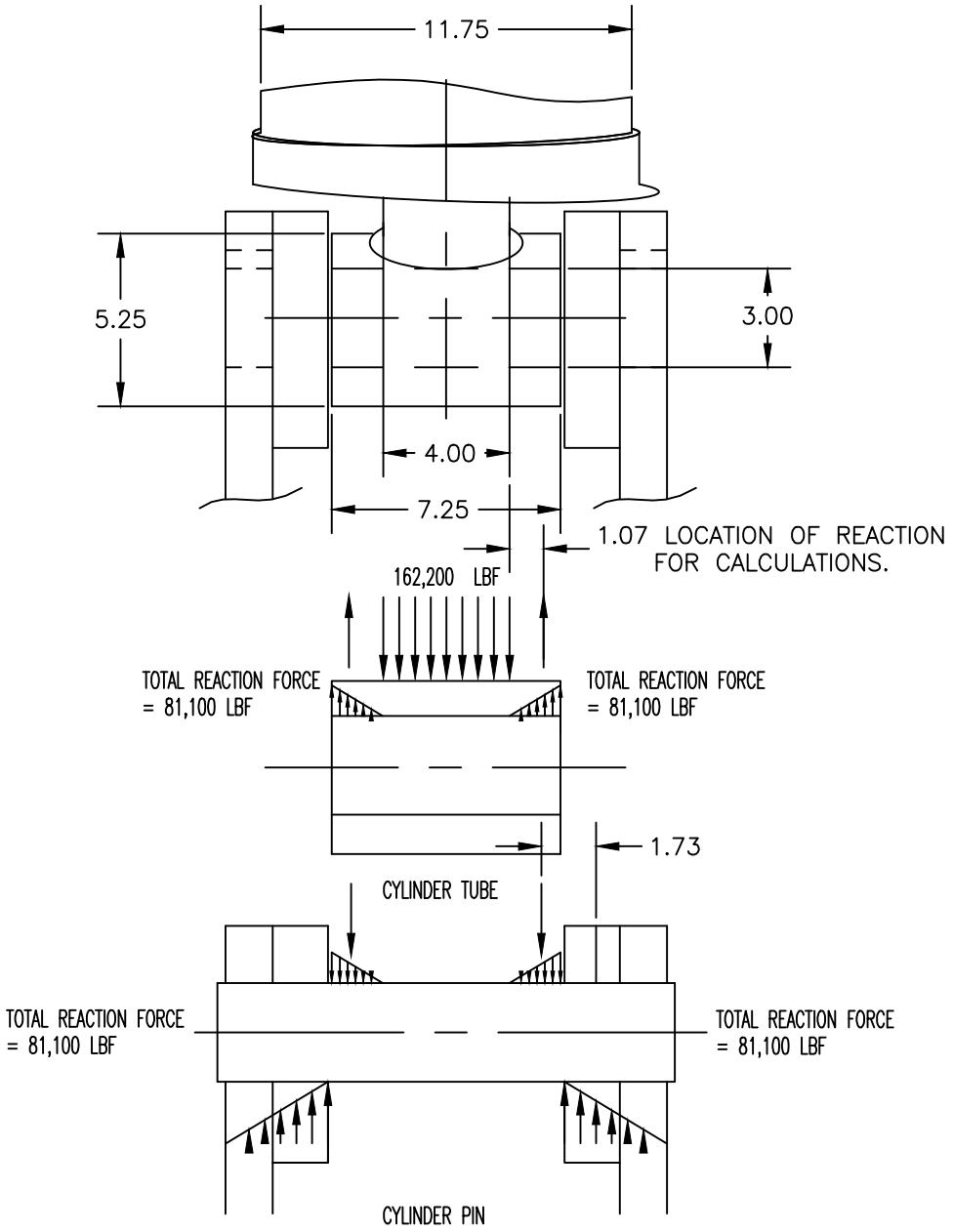


FIG M2.1–D
BOOM CYLD CAP END & PIN

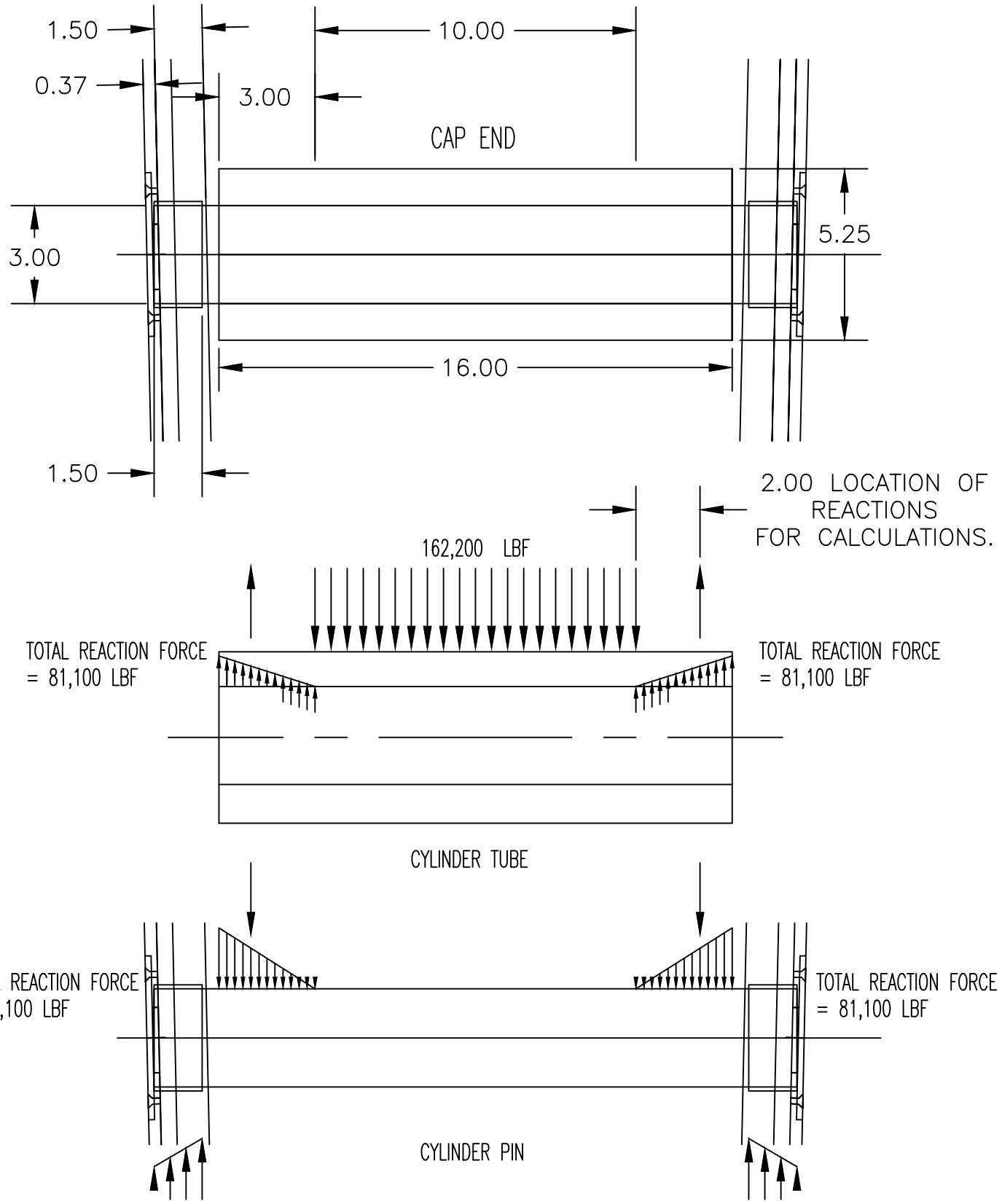


FIG M2.1–E
BOOM CAP END & PIN

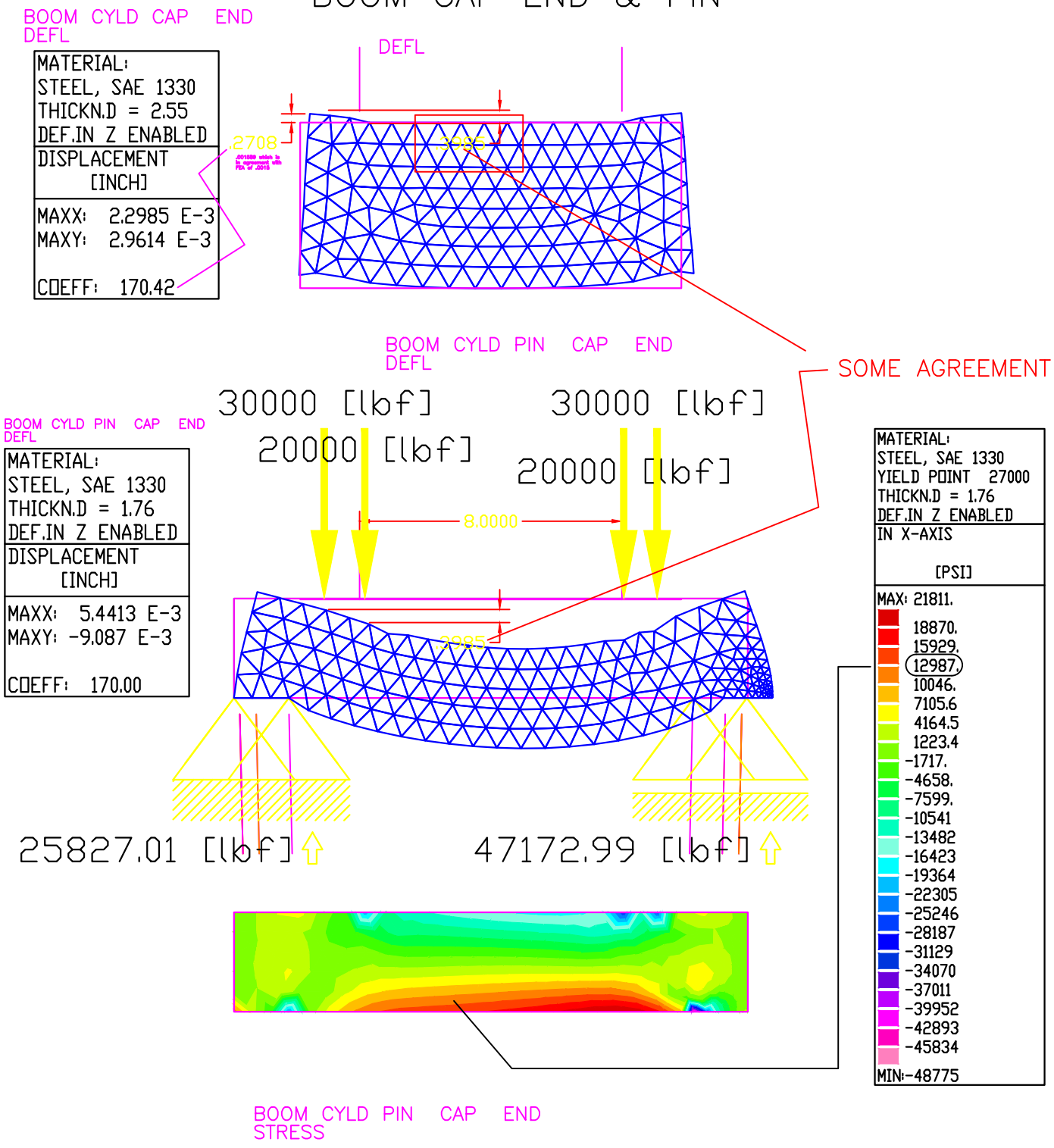
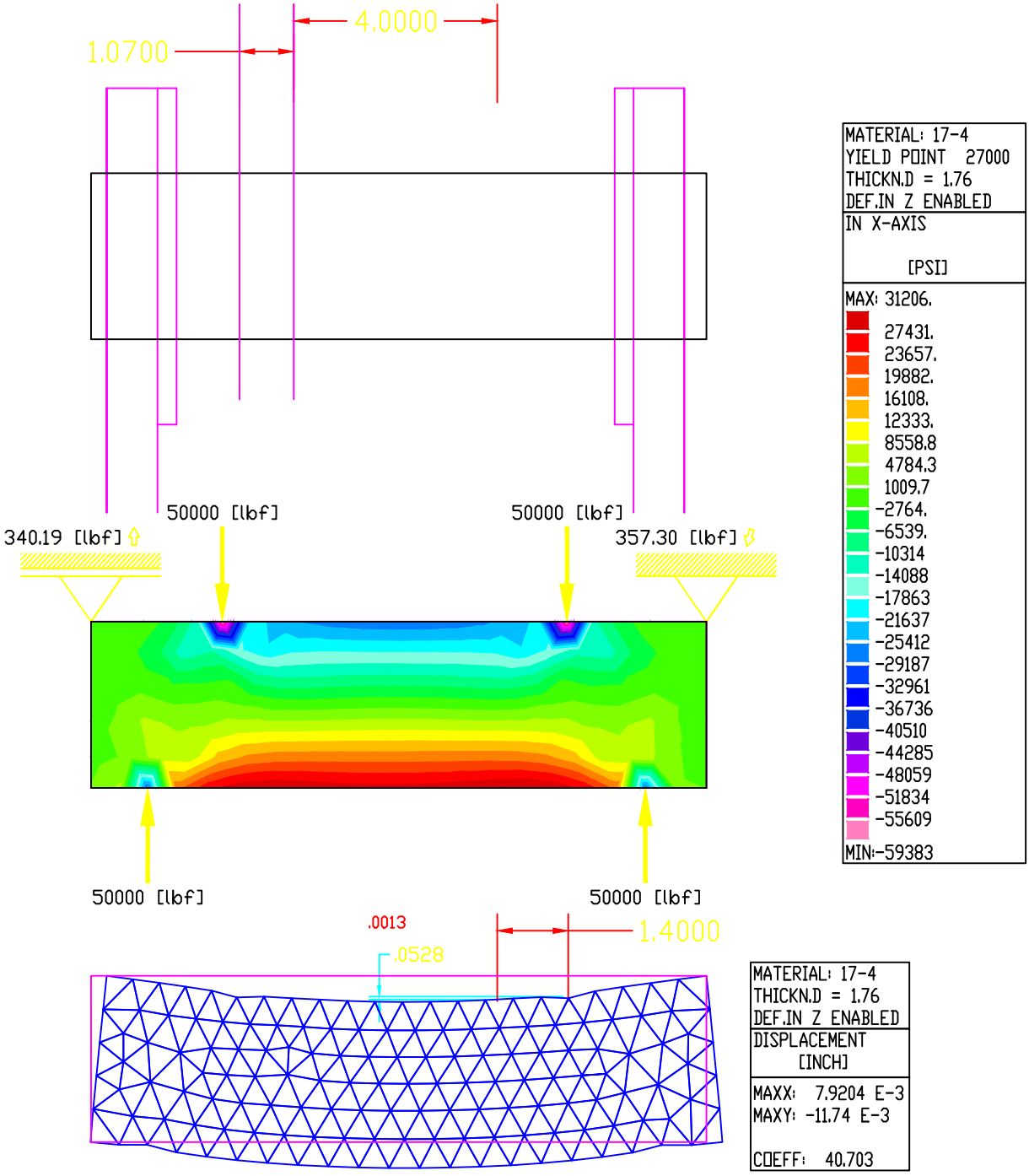
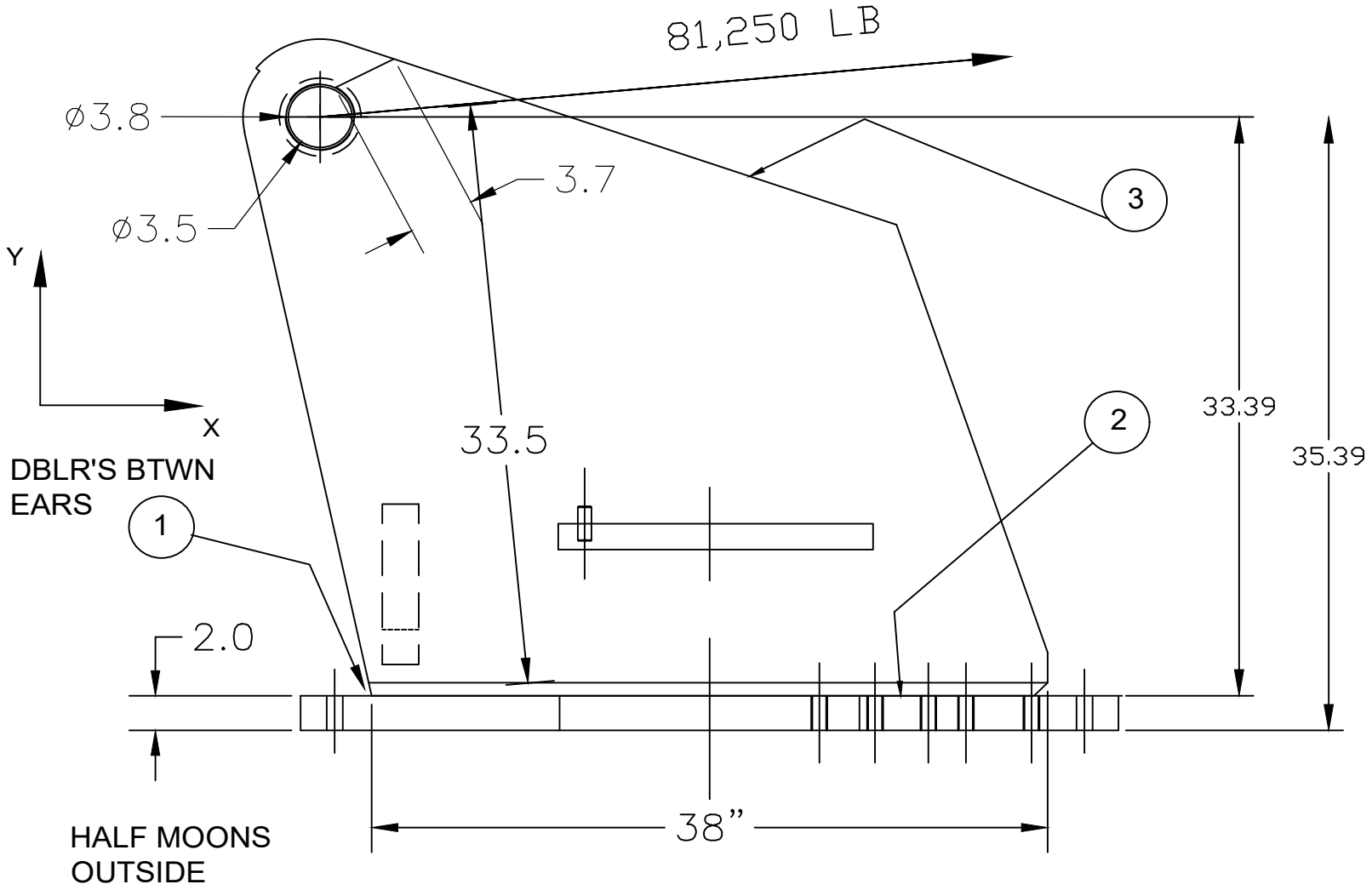


FIG M2.1–F
BOOM PIN, ROD END



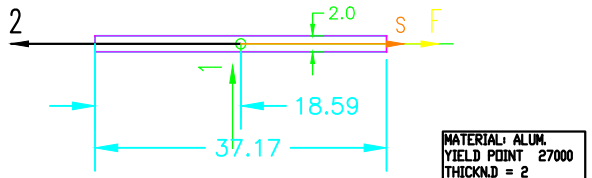


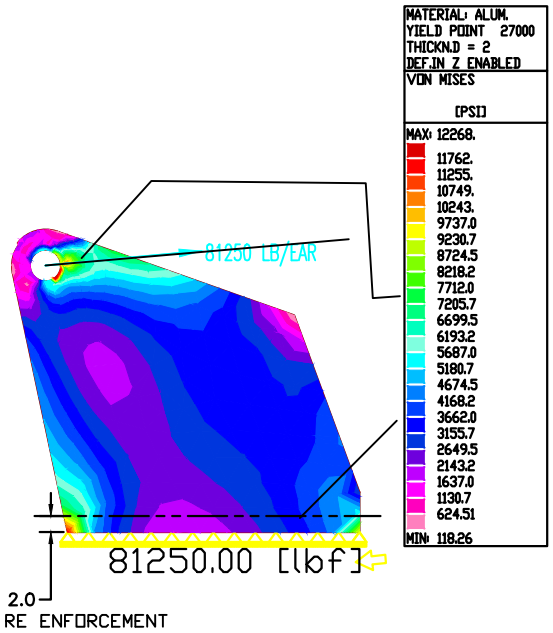
ST1.0

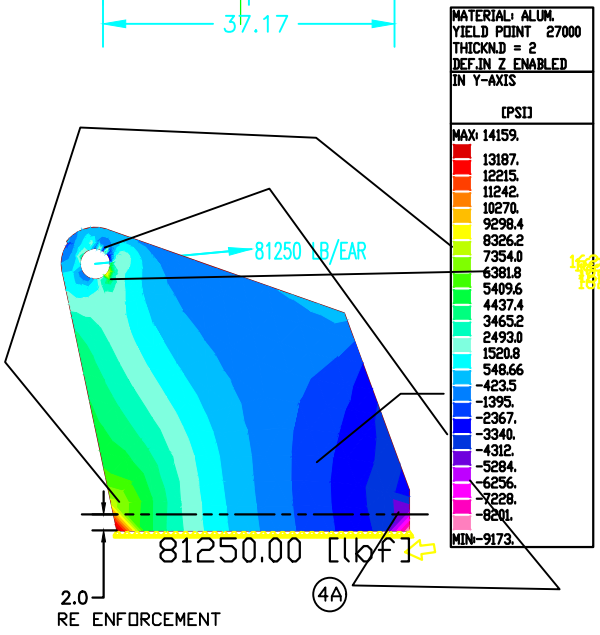
STARSHIP, MAIN EAR (PROFILE)

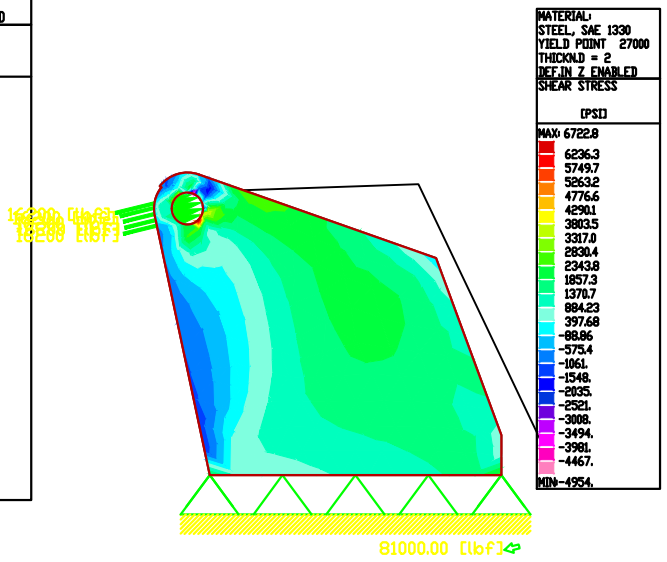
I_1 [INCH^4]	8562
I_2 [INCH^4]	24.78
S_c [INCH]	18.588
S_t [INCH]	18.588
A [INCH^2]	74.34

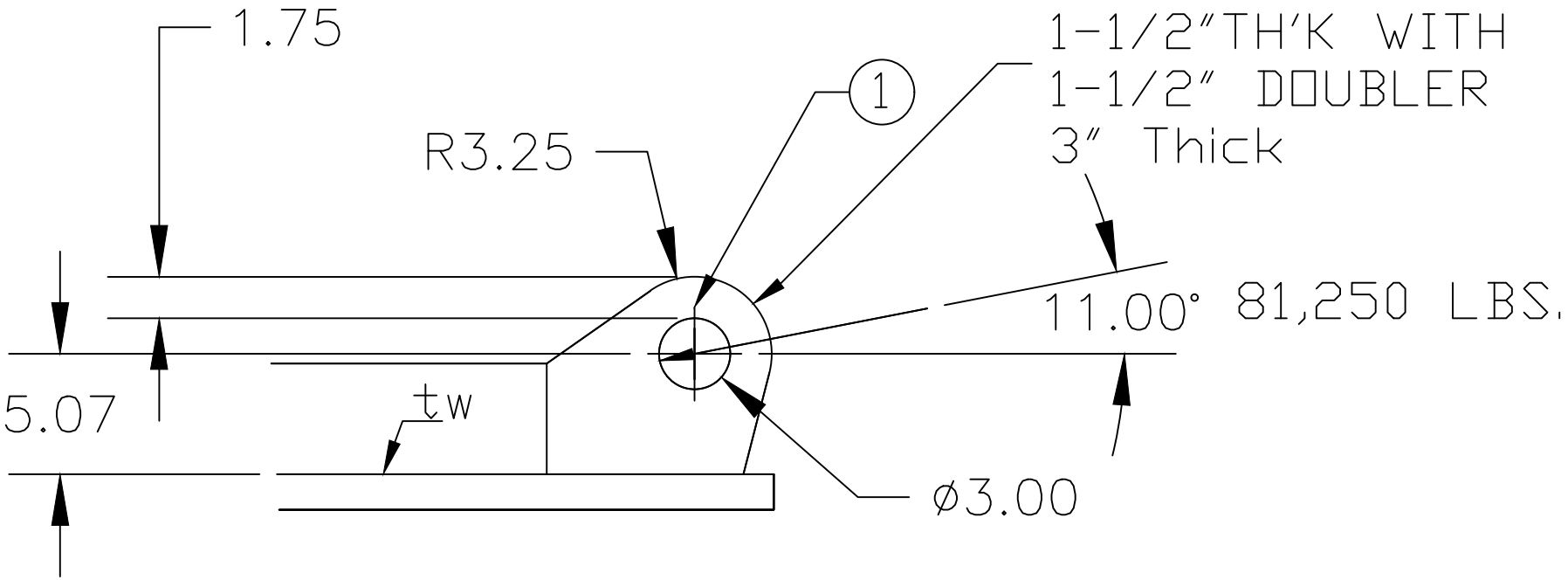
FIG ST1.0-A
STARSHIP MAIN EARS



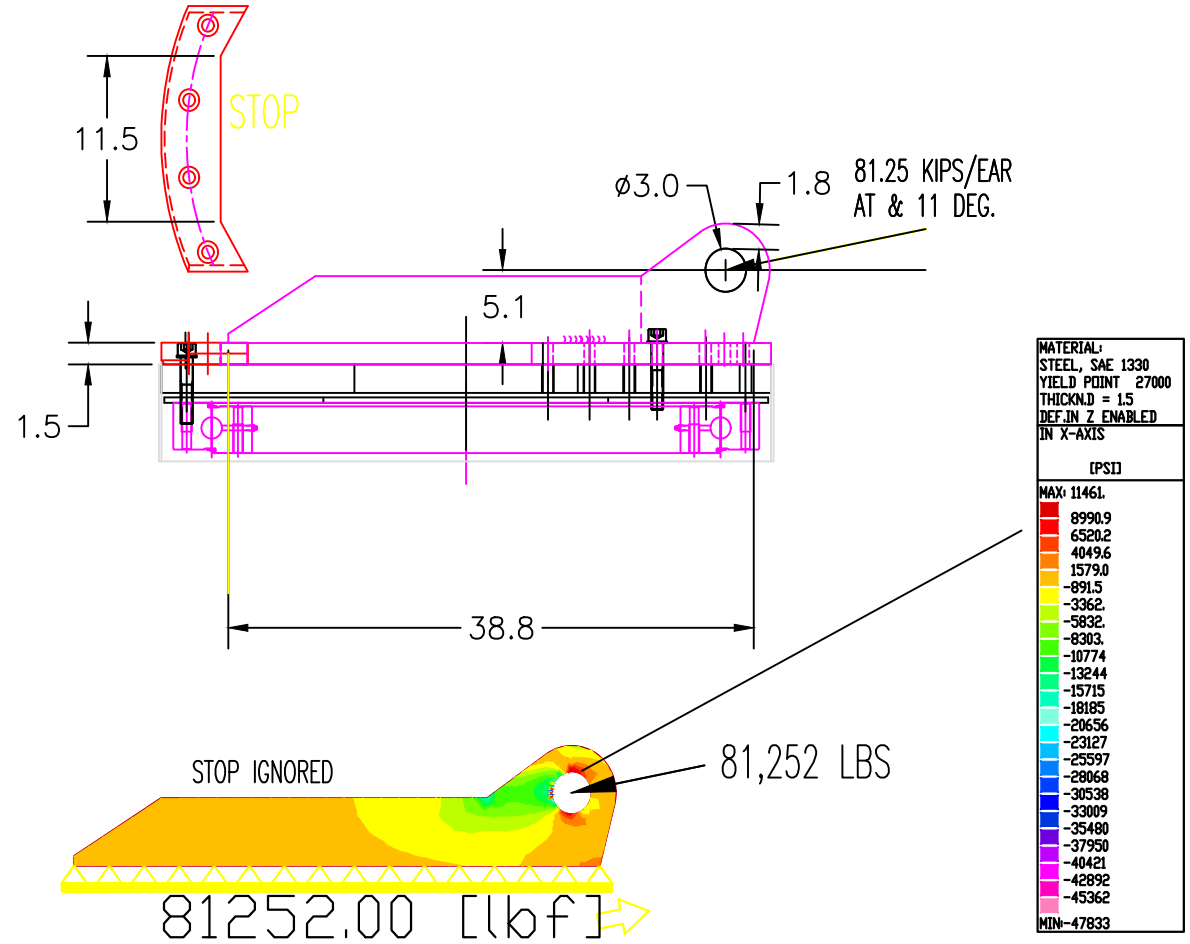








ST2.0
BOOM CYLINDER MOUNT



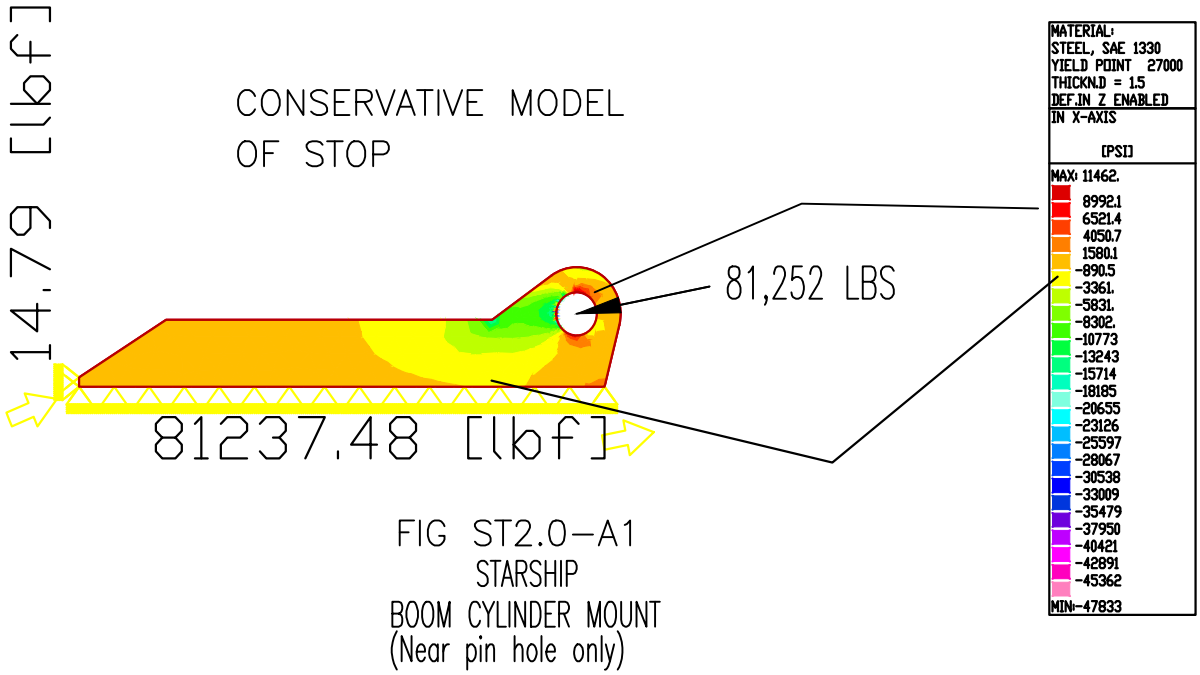
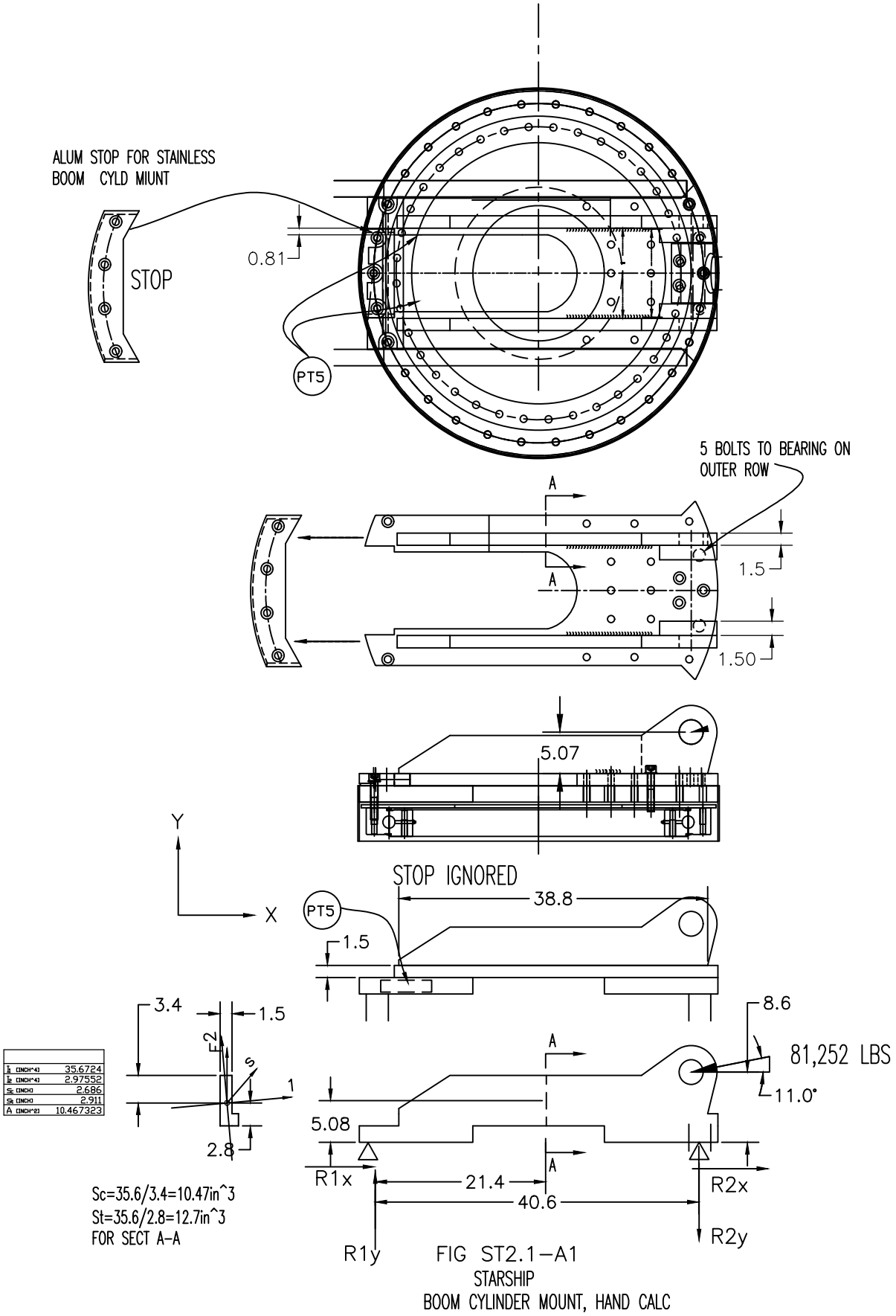


FIG ST2.0–A1
STARSHIP
BOOM CYLINDER MOUNT
(Near pin hole only)



I_x (INCH^4)	35.6724
I_y (INCH^4)	2.97552
S_c (INCH3)	2.686
S_t (INCH3)	2.911
A (INCH^2)	10.467323

FIG ST2.1–A1
STARSHIP
BOOM CYLINDER MOUNT, HAND CALC

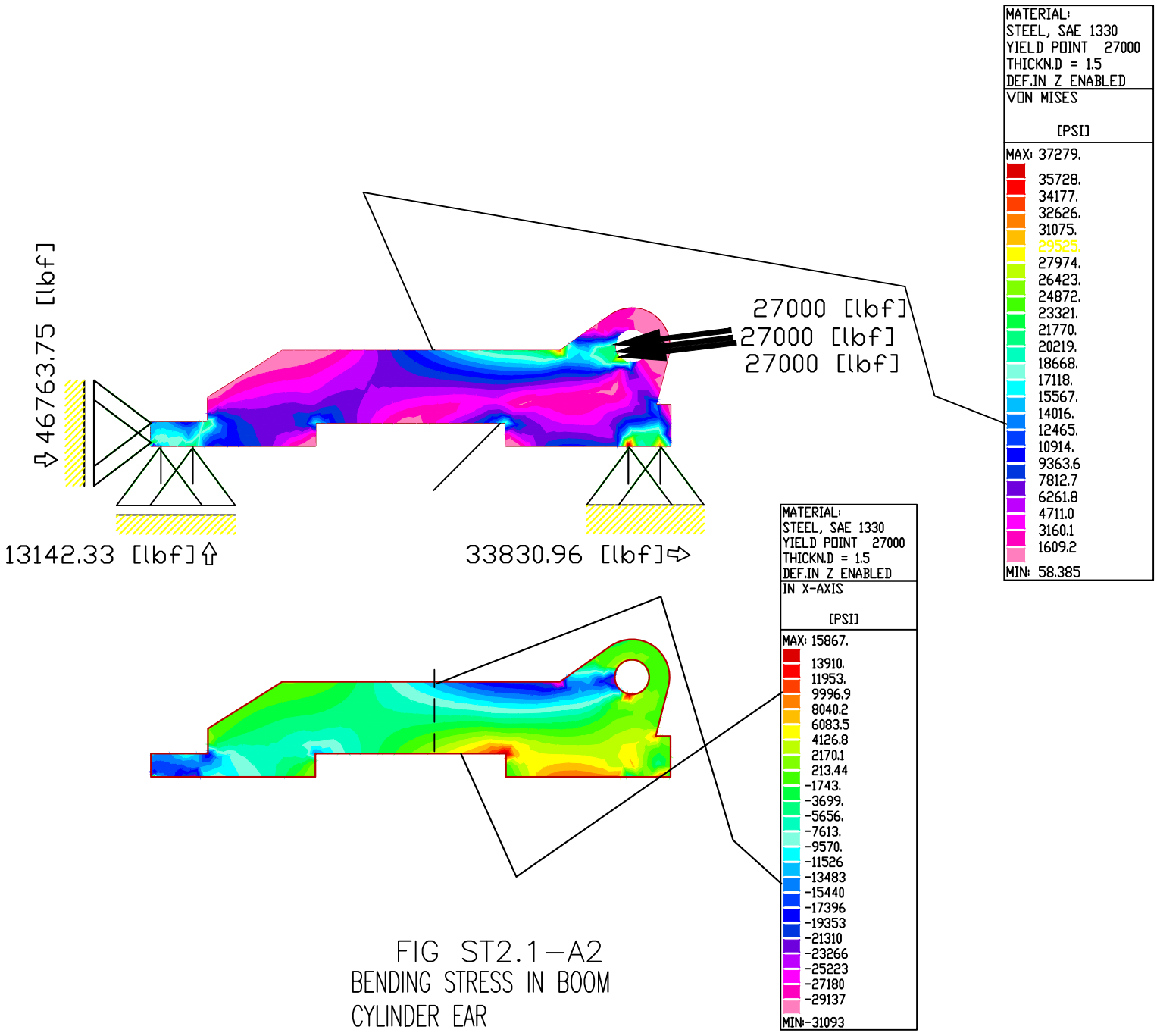
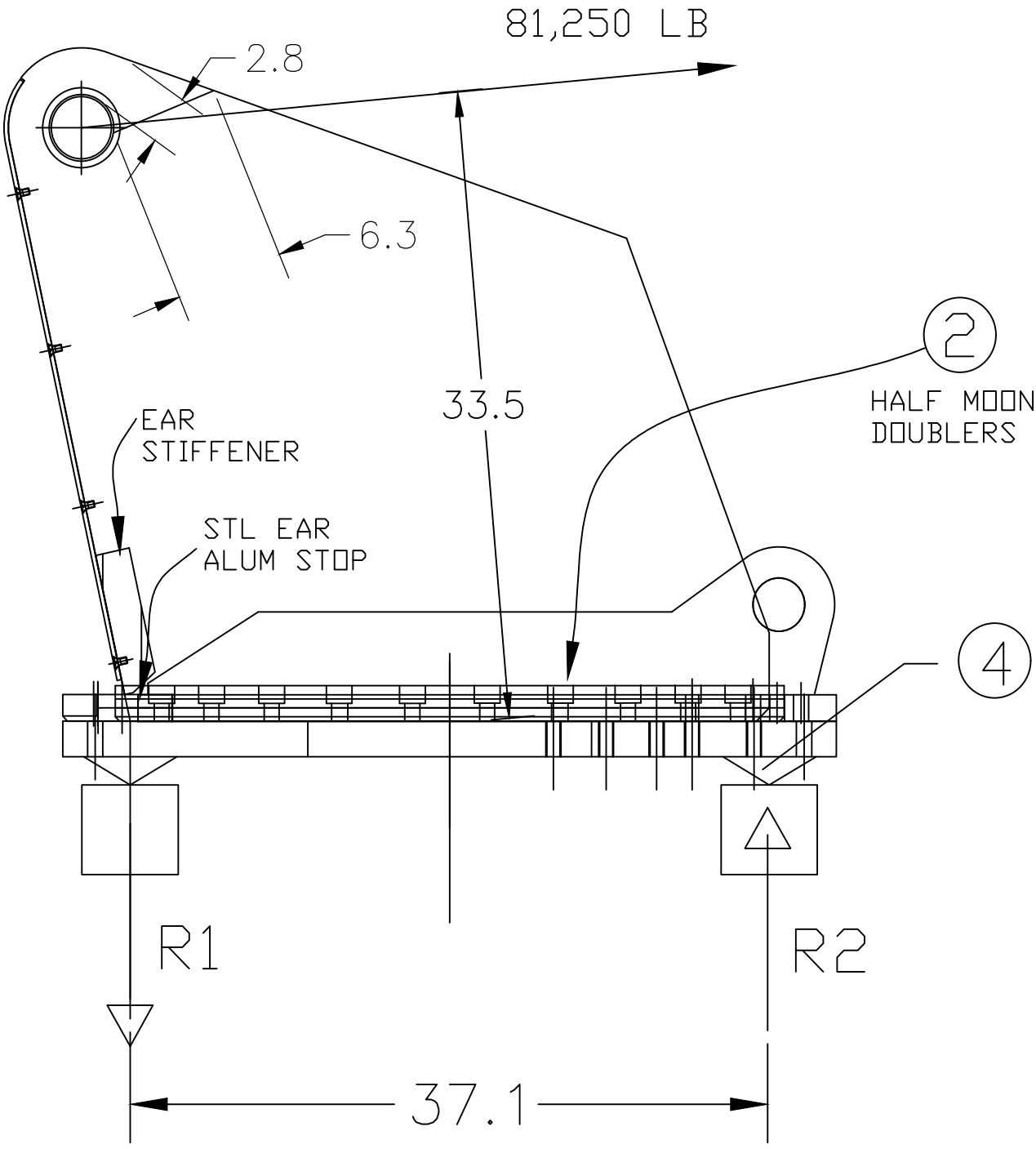


FIG ST2.1–A2
BENDING STRESS IN BOOM
CYLINDER EAR



ST3.0

STARSHIP, MAIN EAR RE-ENFORCEMENT

AT LOWER REAR OF EAR

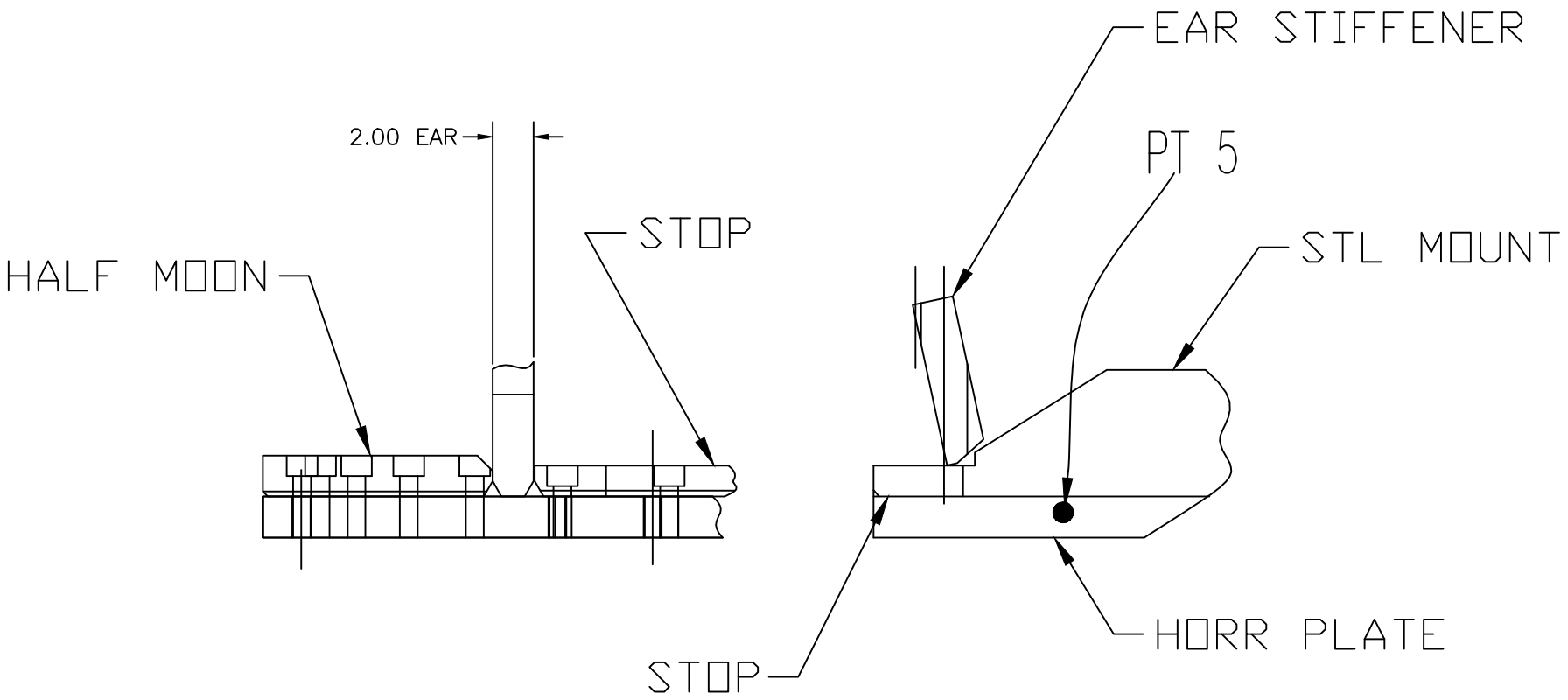


FIG. ST3.0-A1
STARSHIP MAIN HORIZONTAL PLATE &
STARSHIP REINFORCEMENT DOUBLERS

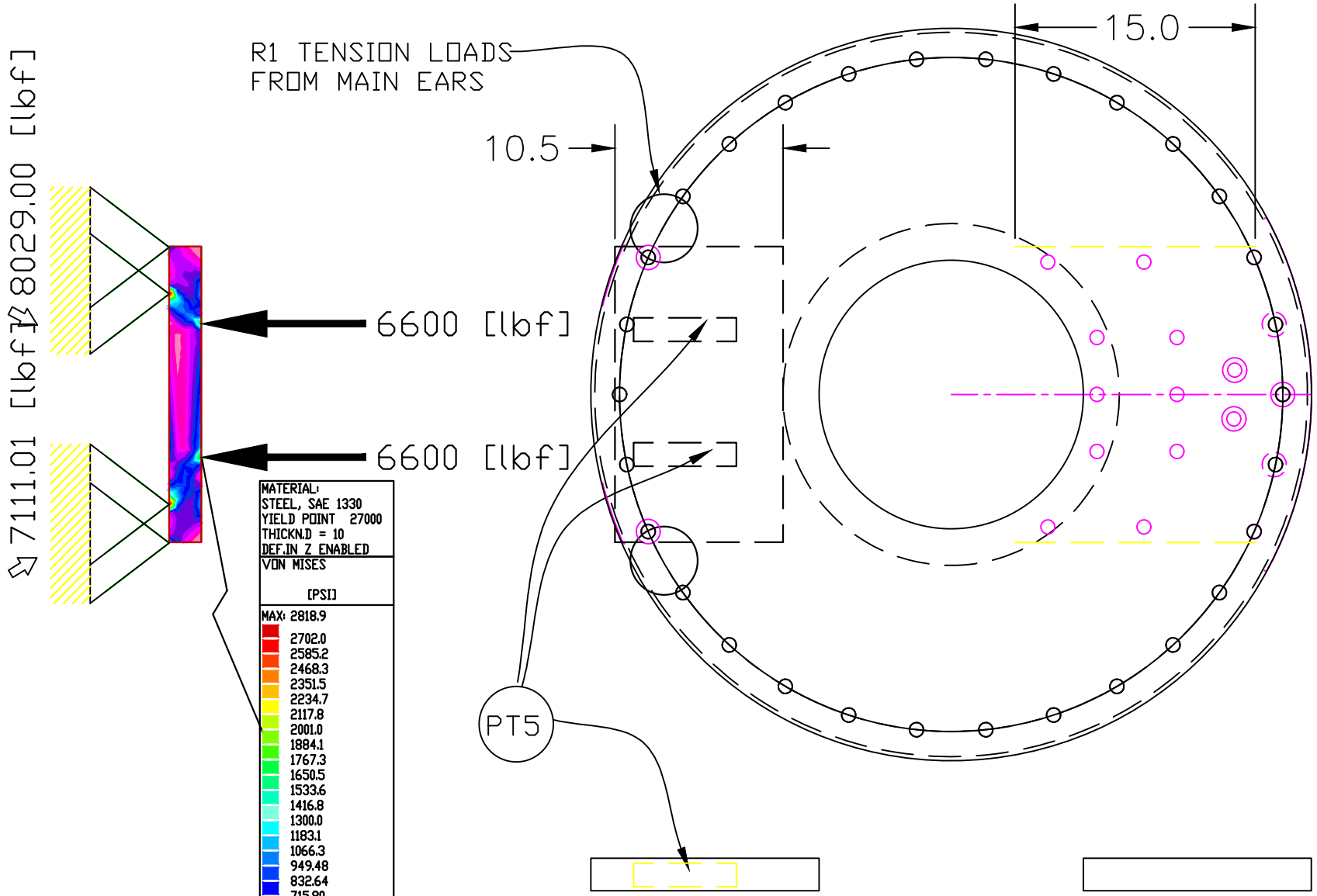


FIG. ST3.0-A2
STARSHIP, HORIZONTAL PLATE
ISOLATED. SEE SECT3.0

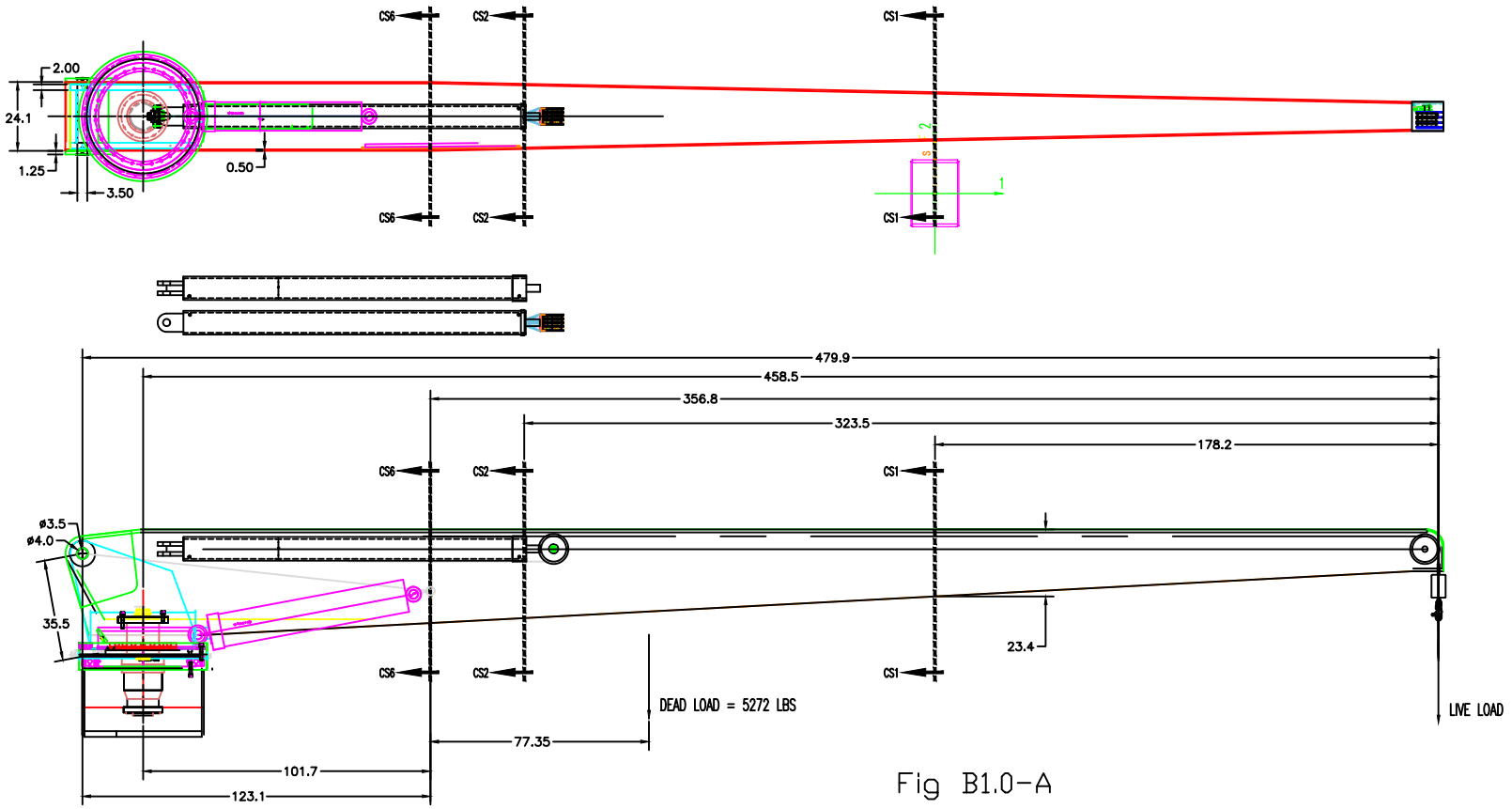


Fig B1.0-A

BOOM CROSS SECTION LOCATIONS

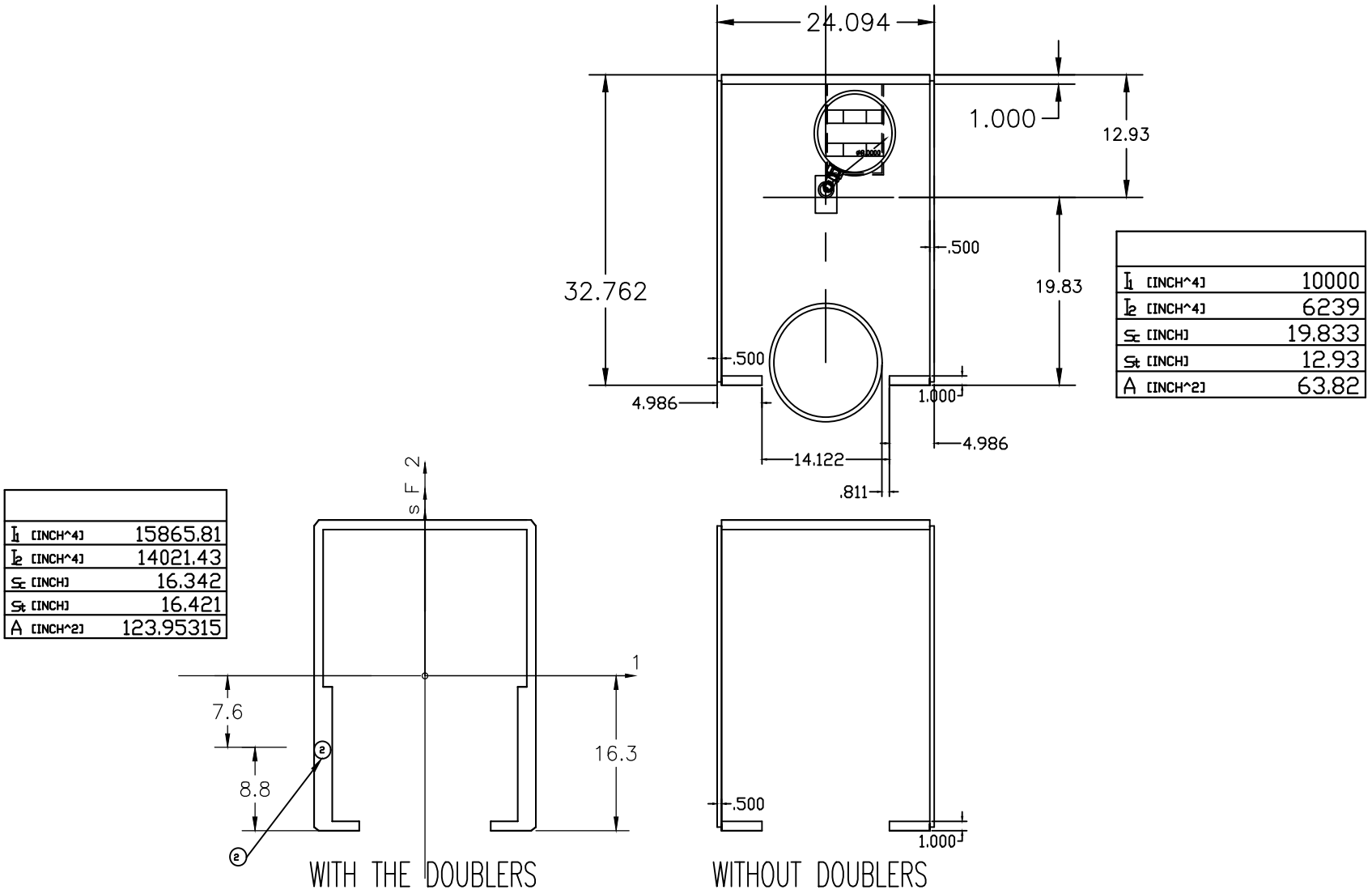
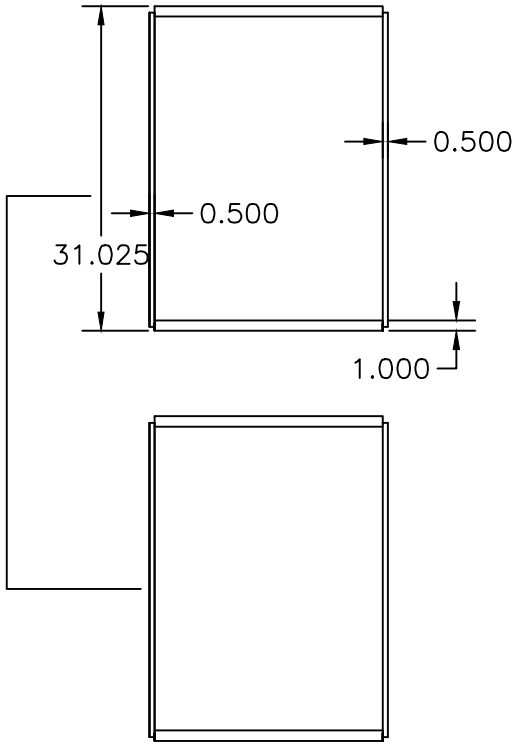


FIG B1.0–A1
SECT "CS6"



I_1 [INCH^4]	12084
I_2 [INCH^4]	5458
S_c [INCH]	15.462
S_t [INCH]	15.564
A [INCH^2]	73.61

Mcap= 7000x12084)/(15.46x12)= 456 ftk
Fb=M/S=15.46X325X10000)/12084= 4157PSI
CONCL; DBLRS DO NOT NEED TO EXTEND ANY FURTHER, EXCEPT TO MAYBE REDUCE LOCAL PLATE BEND STRESSES TO BE CHECKED BY JL FEA

FIG B1.0-A2
SECT "CS2"

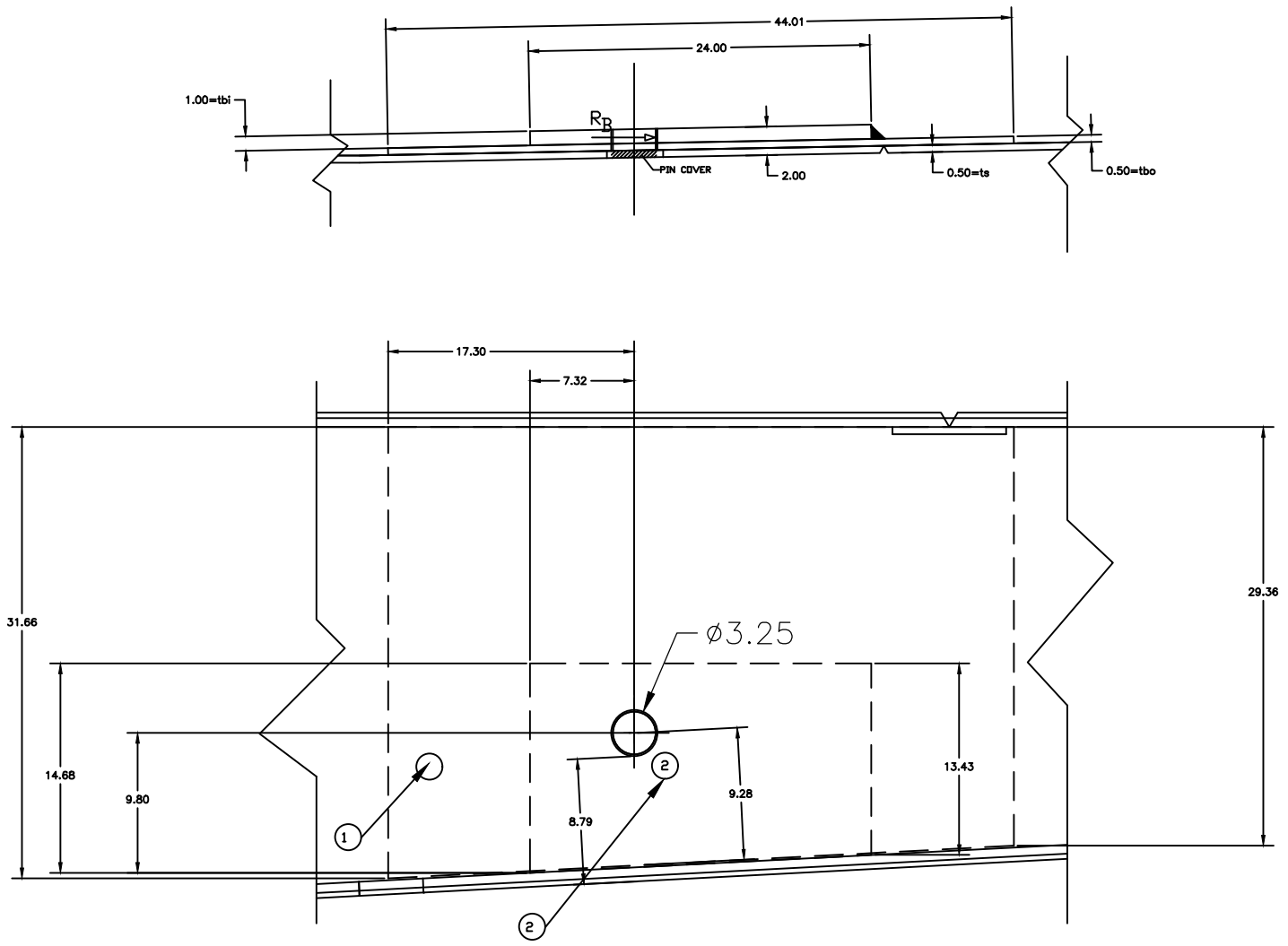


FIG B2.0-A1
BOOM DBLR FEA MODEL
REF. ...../BOMCYLDDBLR1

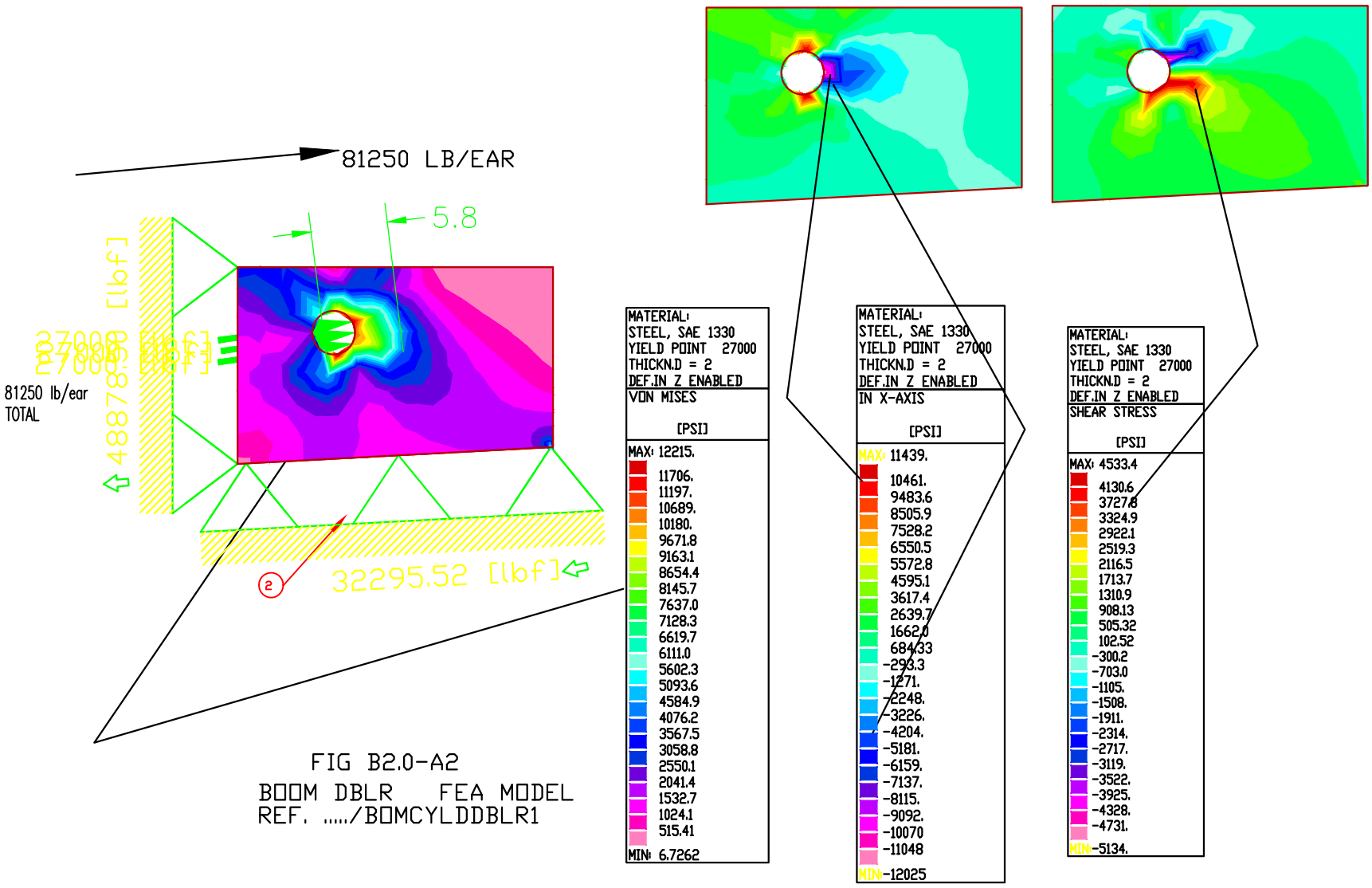


FIG B2.0-A2
BOOM DBLR FEA MODEL
REF. ...../BOMCYLDDBLR1

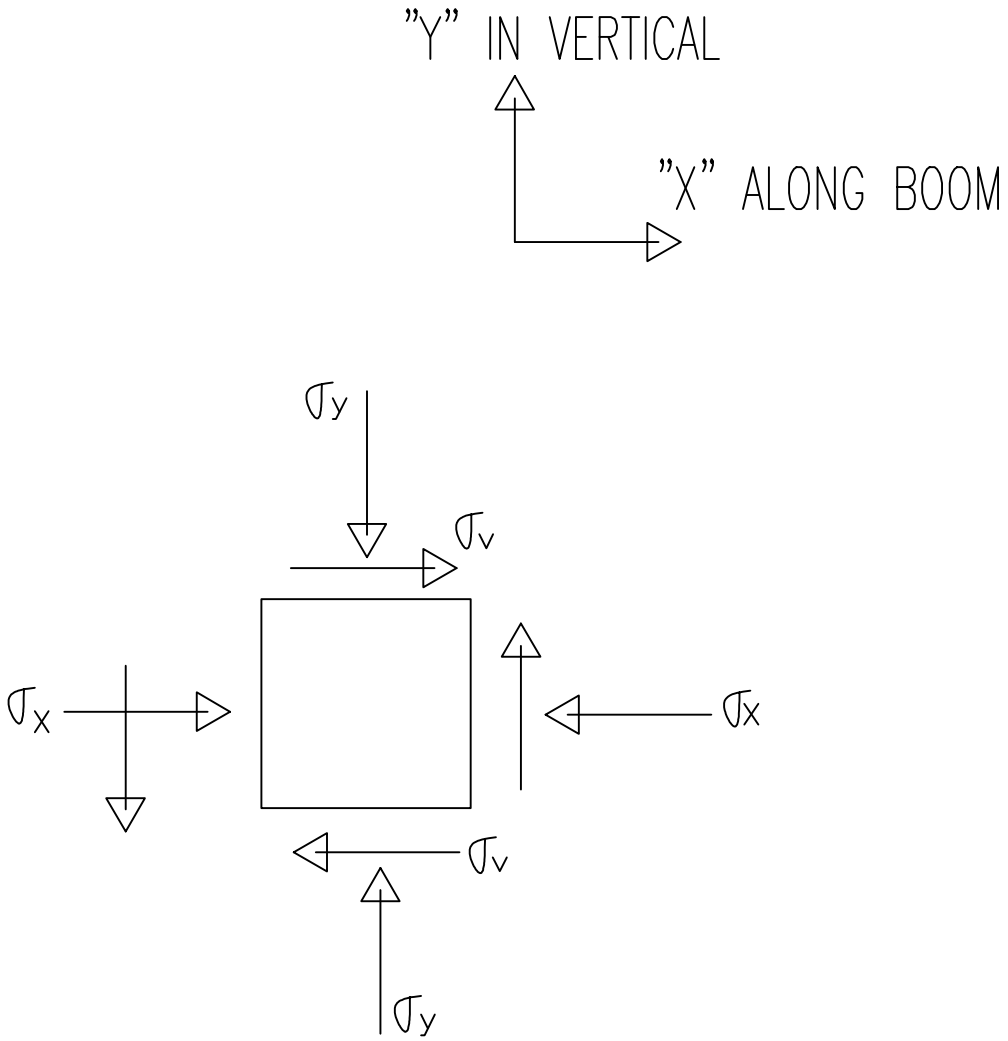


FIG. B4.0
BOOM MAIN PIN
DOUBLERS STRESSES

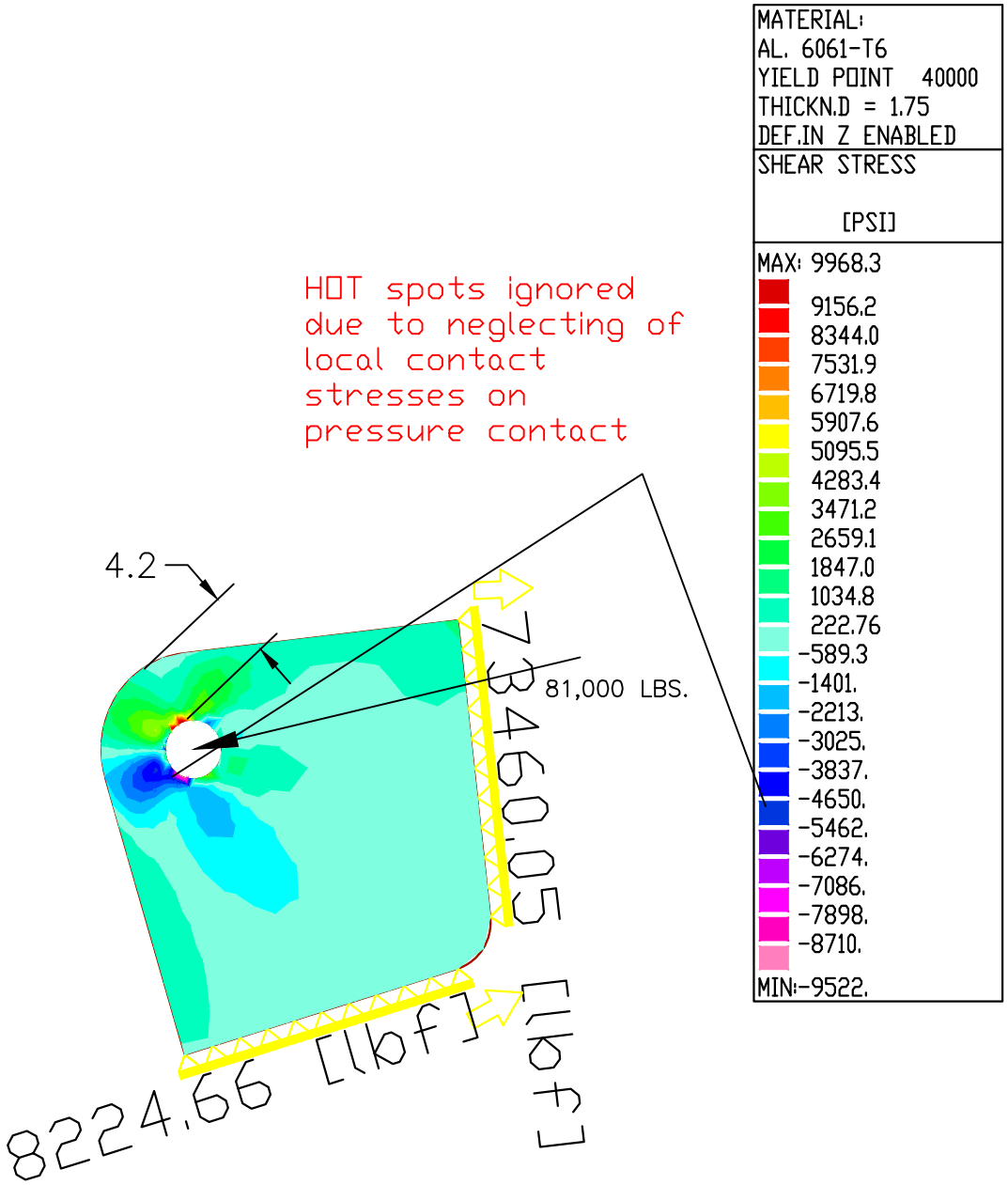


FIG B5.1-A
BOOM MAIN PIN DBLRS

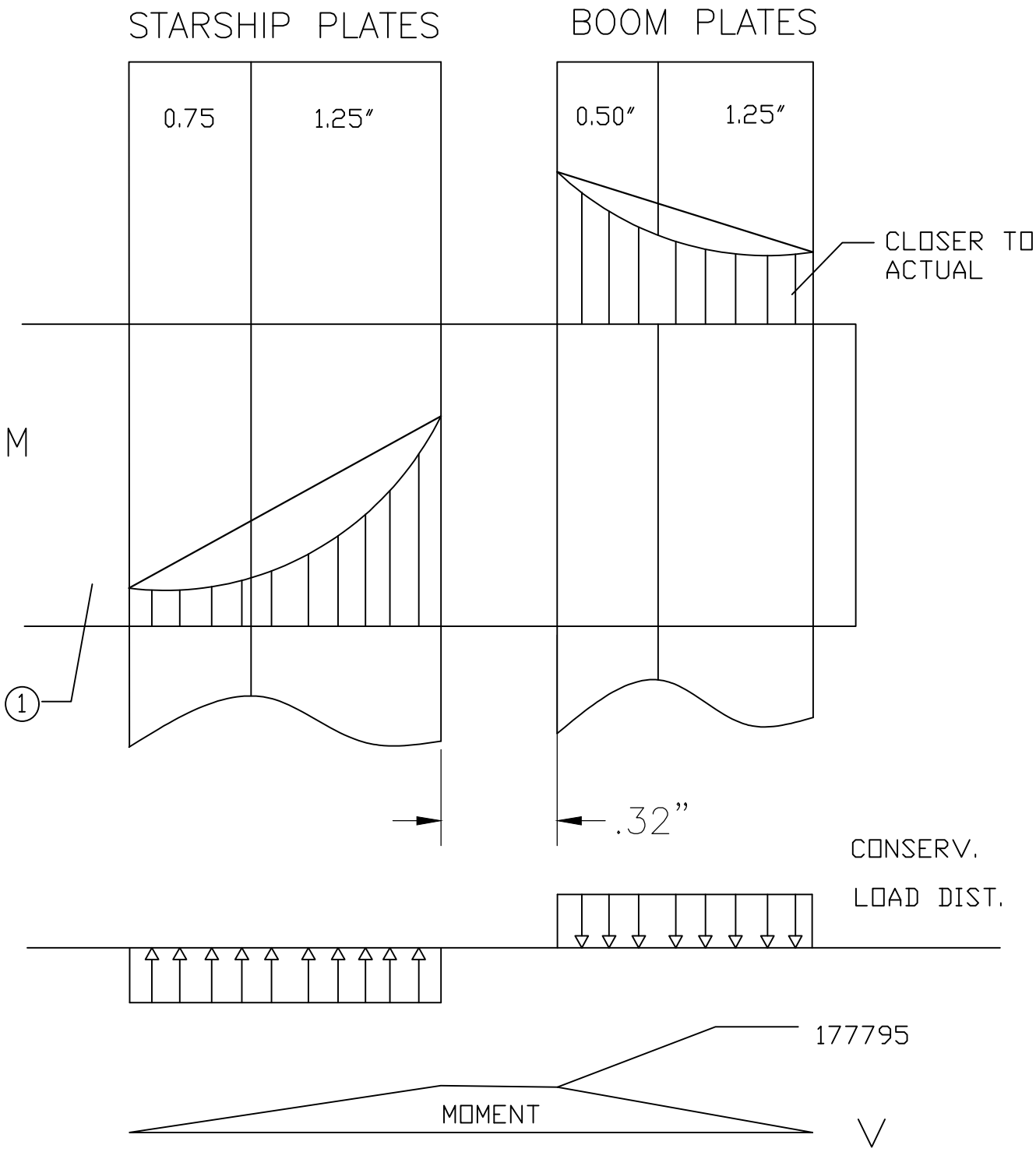


FIG P1.0

MAIN BOOM / STARSHIP PIN

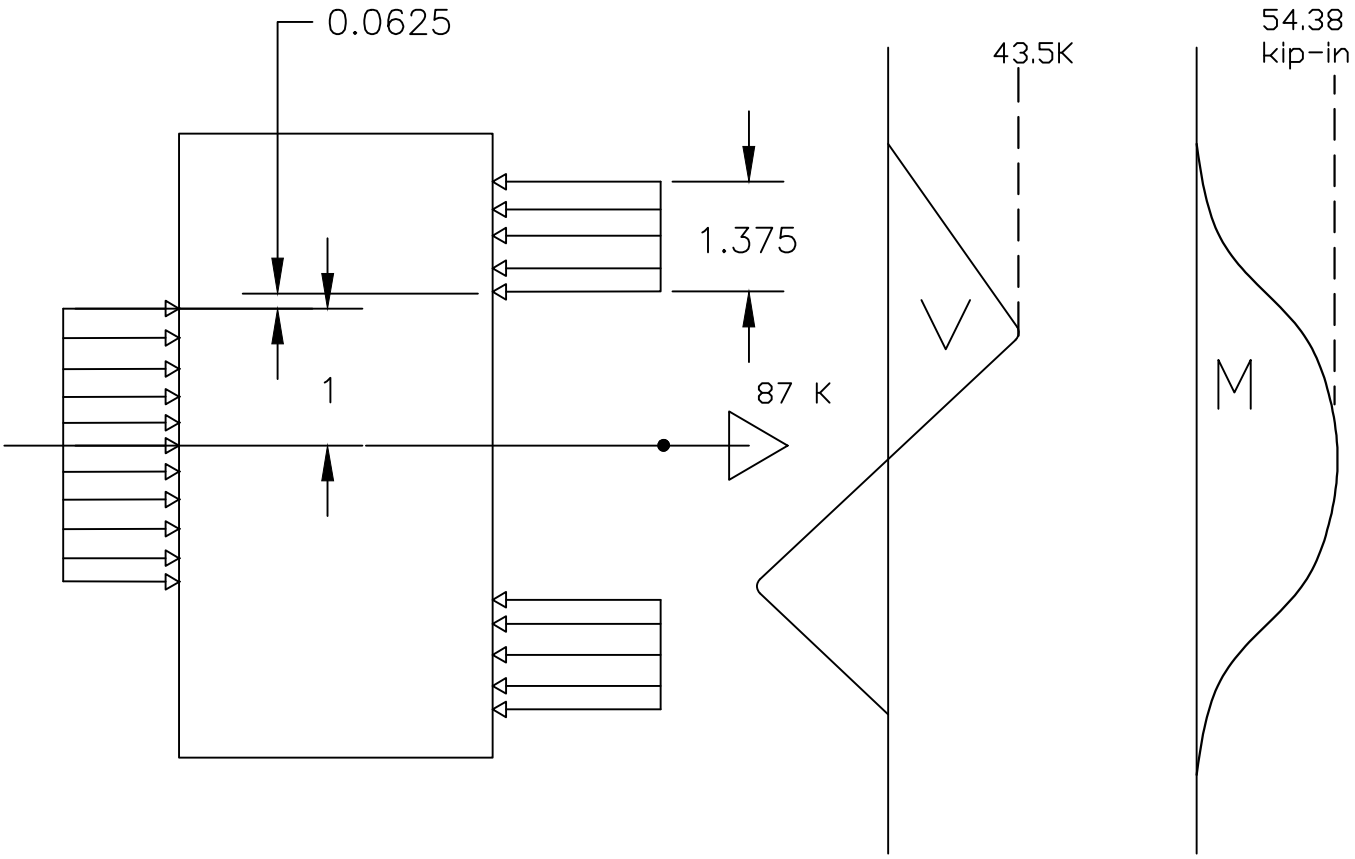


FIG P2.0

CABLE CYLINDER PIN

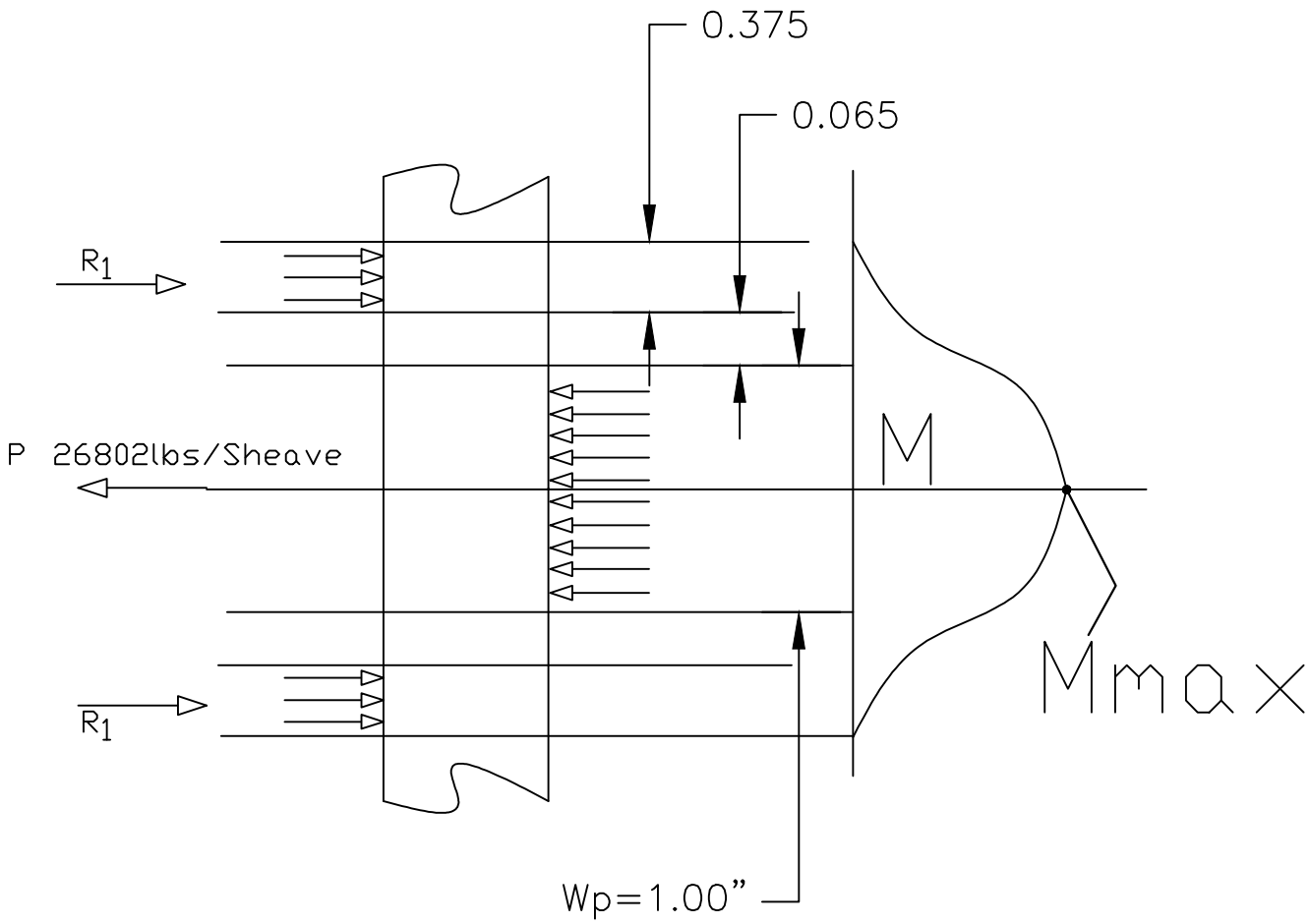


FIG P3.0

BOOM HEAD PULLEY PIN

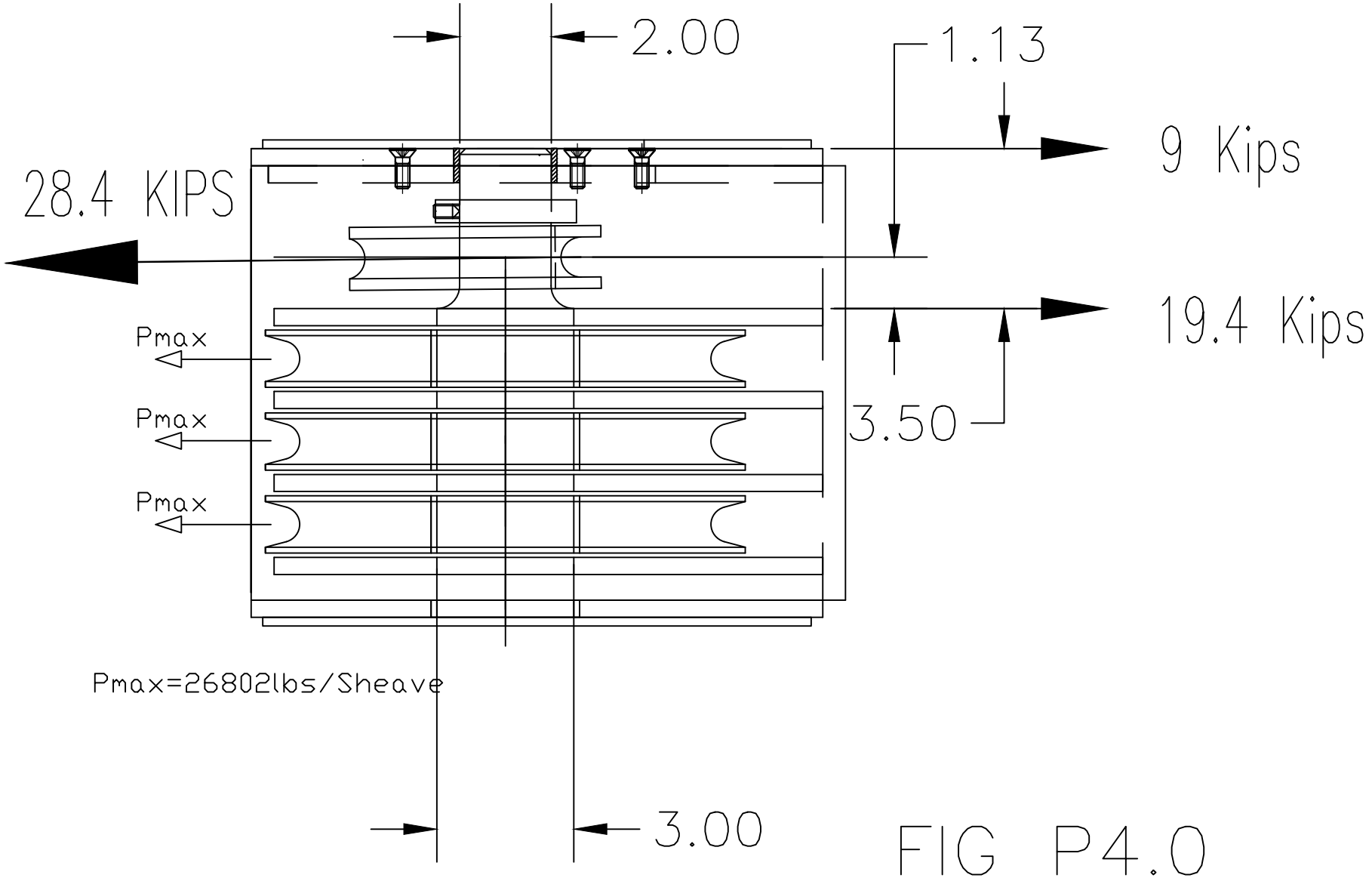
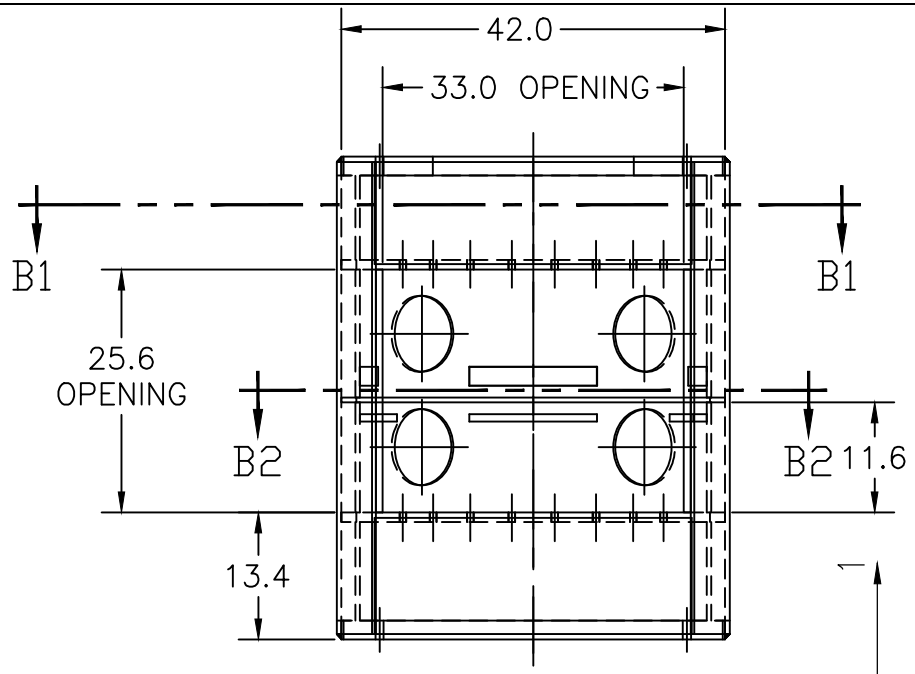
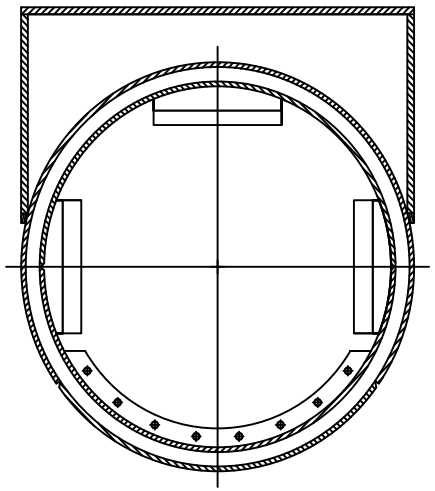


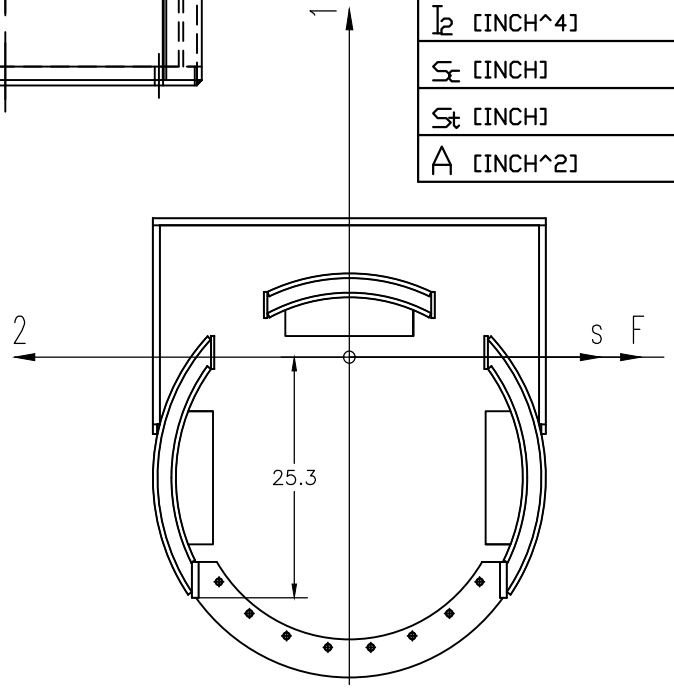
FIG P4.0
BITTER END PIN



I_1 [INCH^4]	40790
I_2 [INCH^4]	21170
S_c [INCH]	21.53
S_t [INCH]	21.53
A [INCH^2]	144.17



SECTION "B1-B1"



SECTION "B2-B2"

FIG BA1.0–A SECTION B2 PROPERTIES

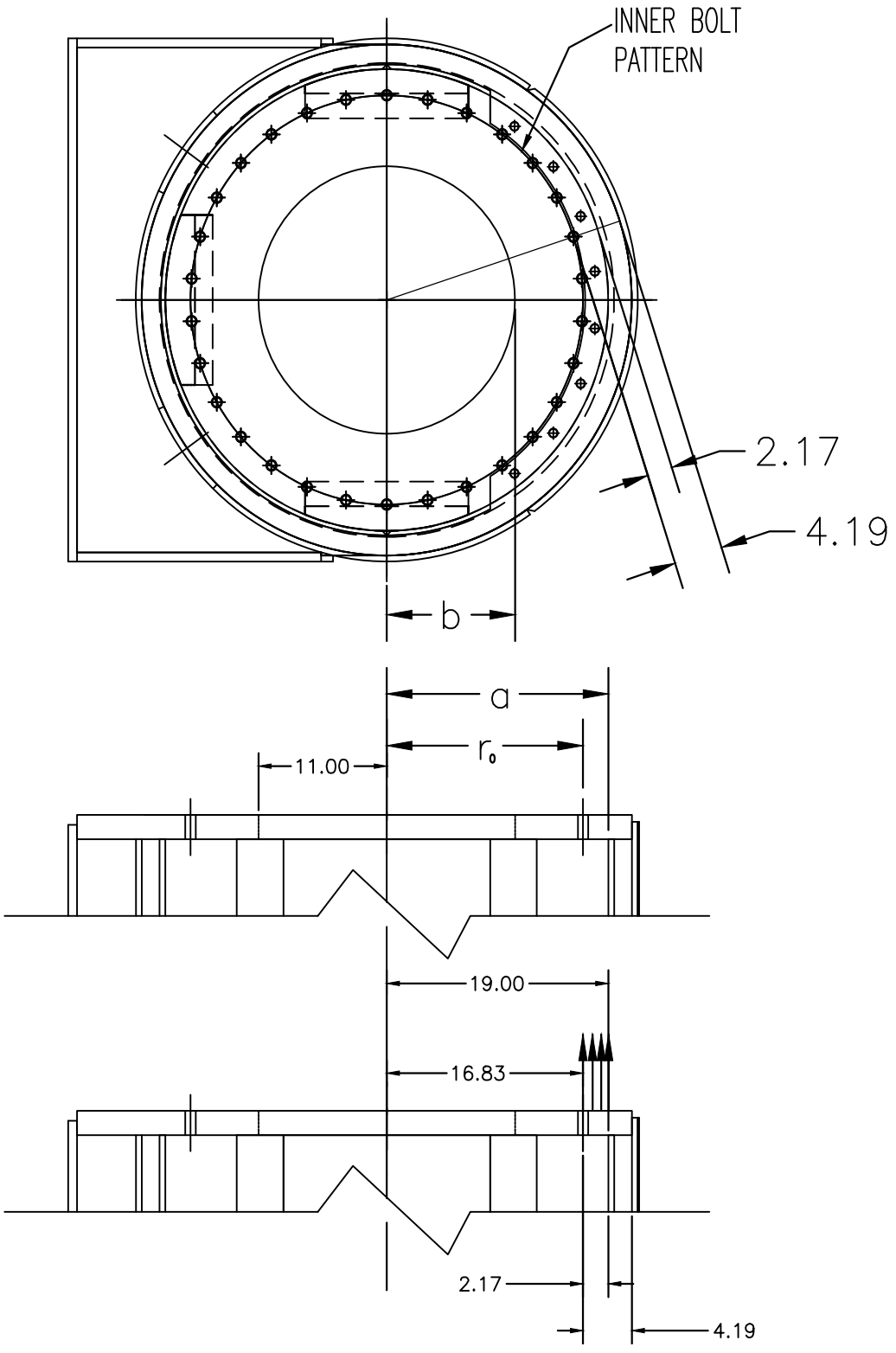


FIG BA2.0
TOP PLATE BOLT LOADS SECT BA2.0

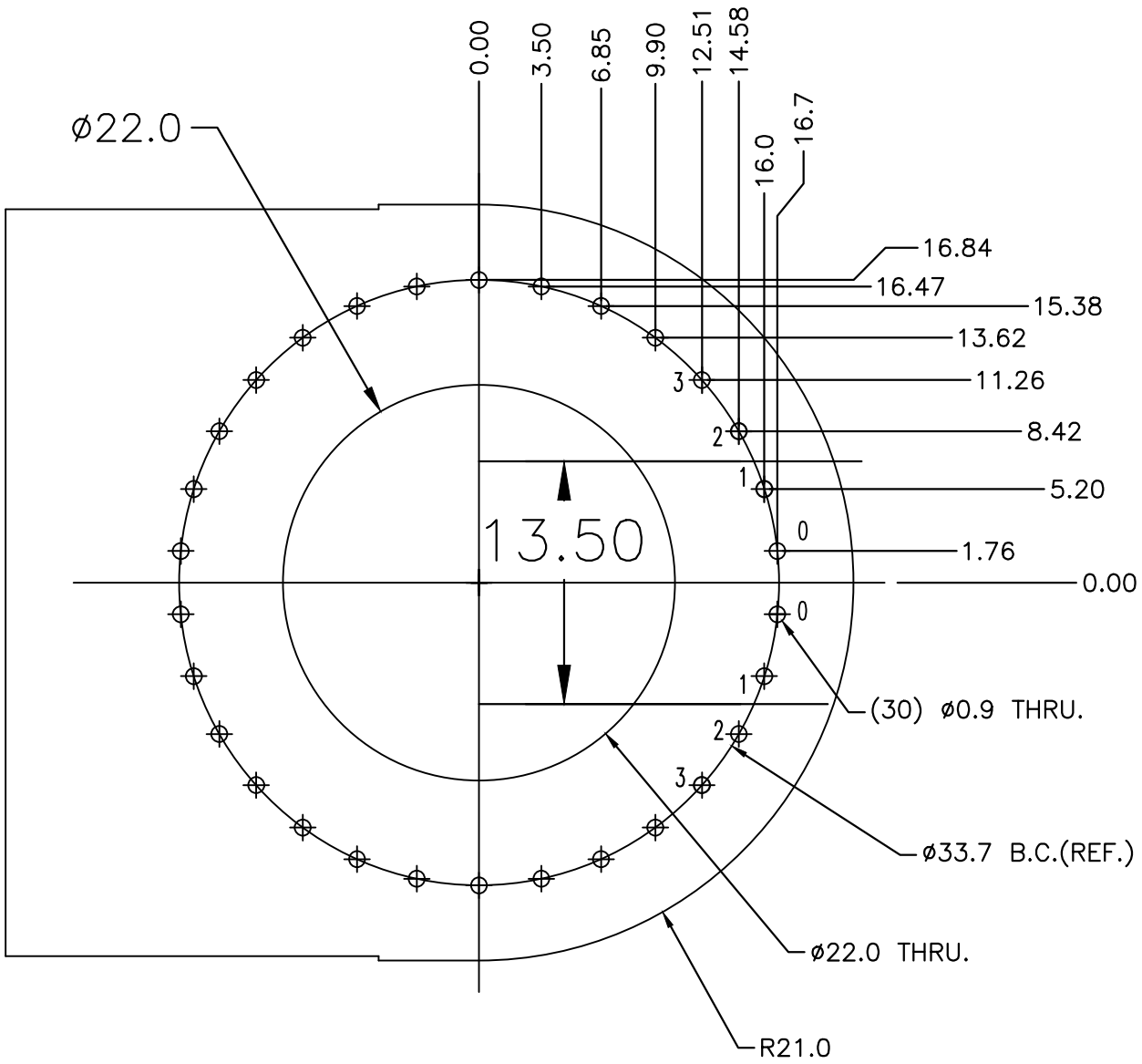


FIG BA2.1 TOP PLATE

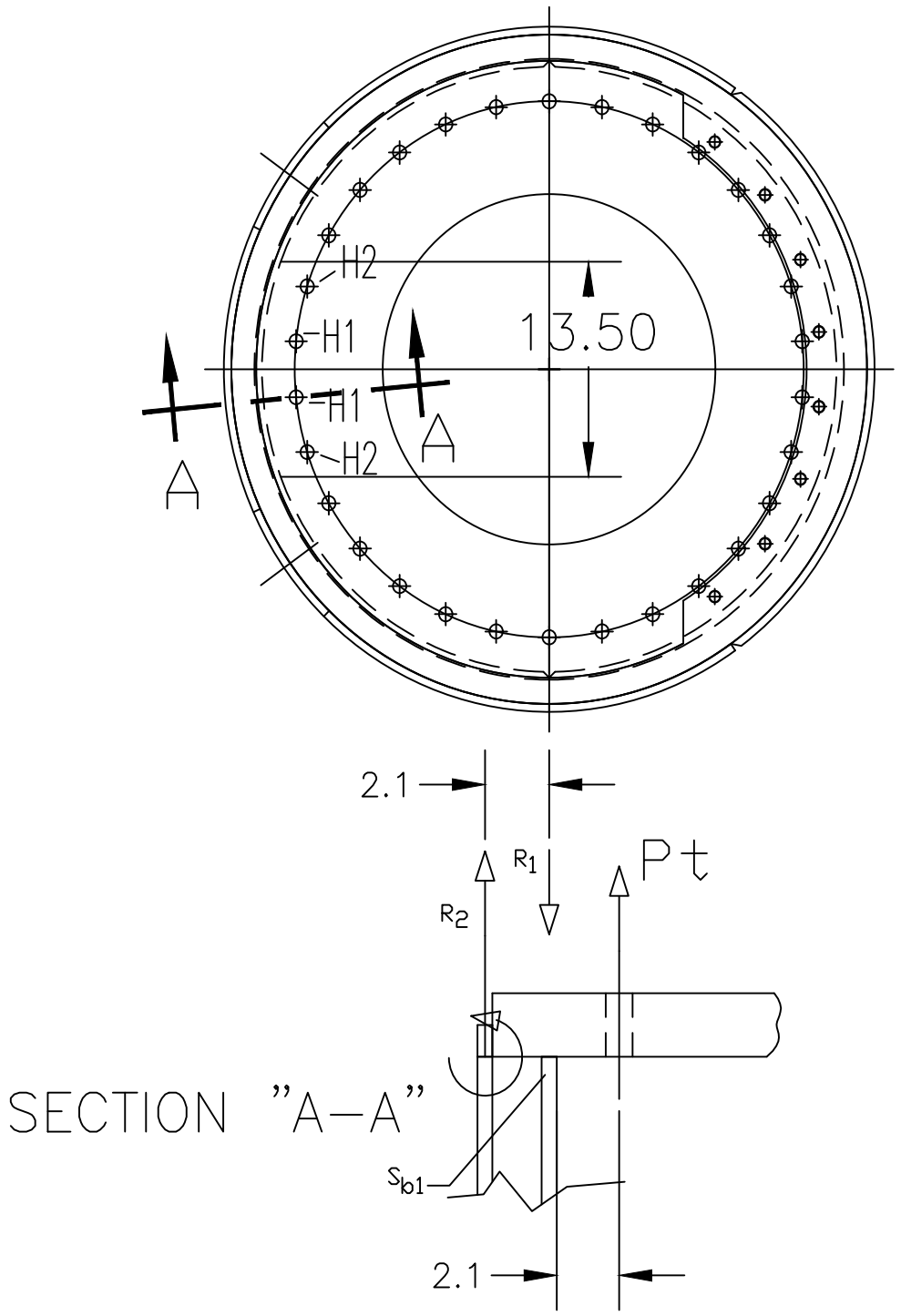
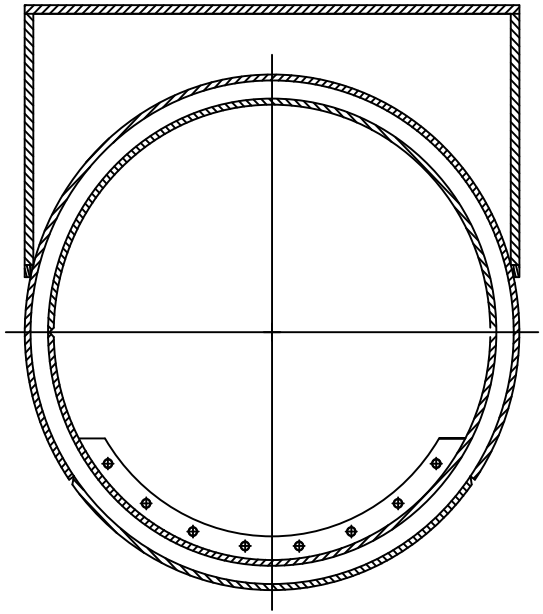
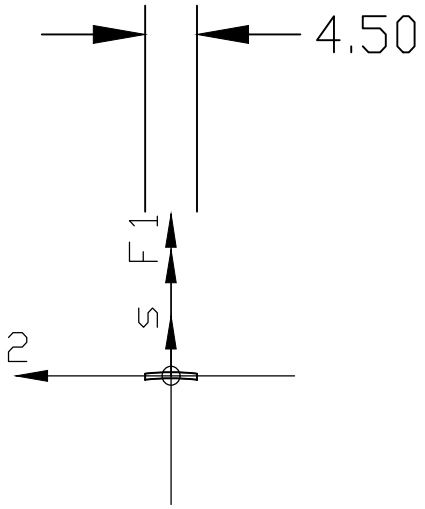
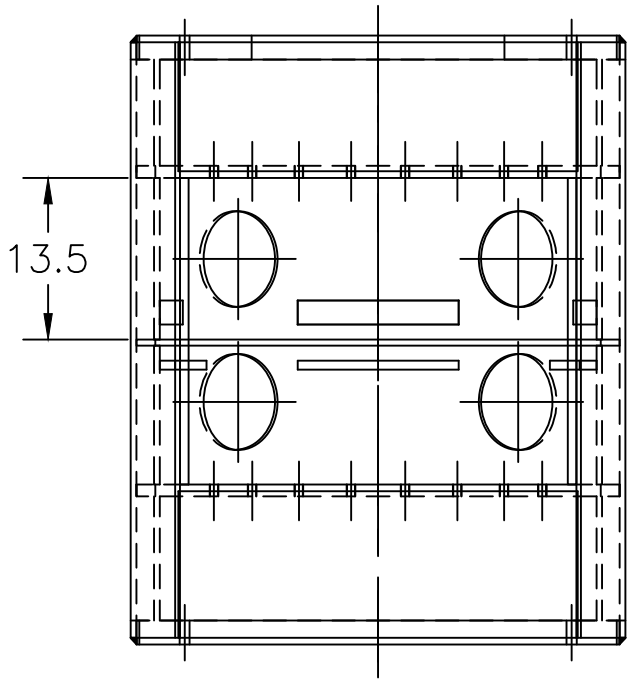


FIG BA3.1 GUSSET PLATE







I_1 [INCH^4]	3.812
I_2 [INCH^4]	0.05069
S_c [INCH]	0.3397
S_t [INCH]	0.2941
A [INCH^2]	2.255

FIG. BA4.1
DATA FOR LOCALIZED BUCKLING

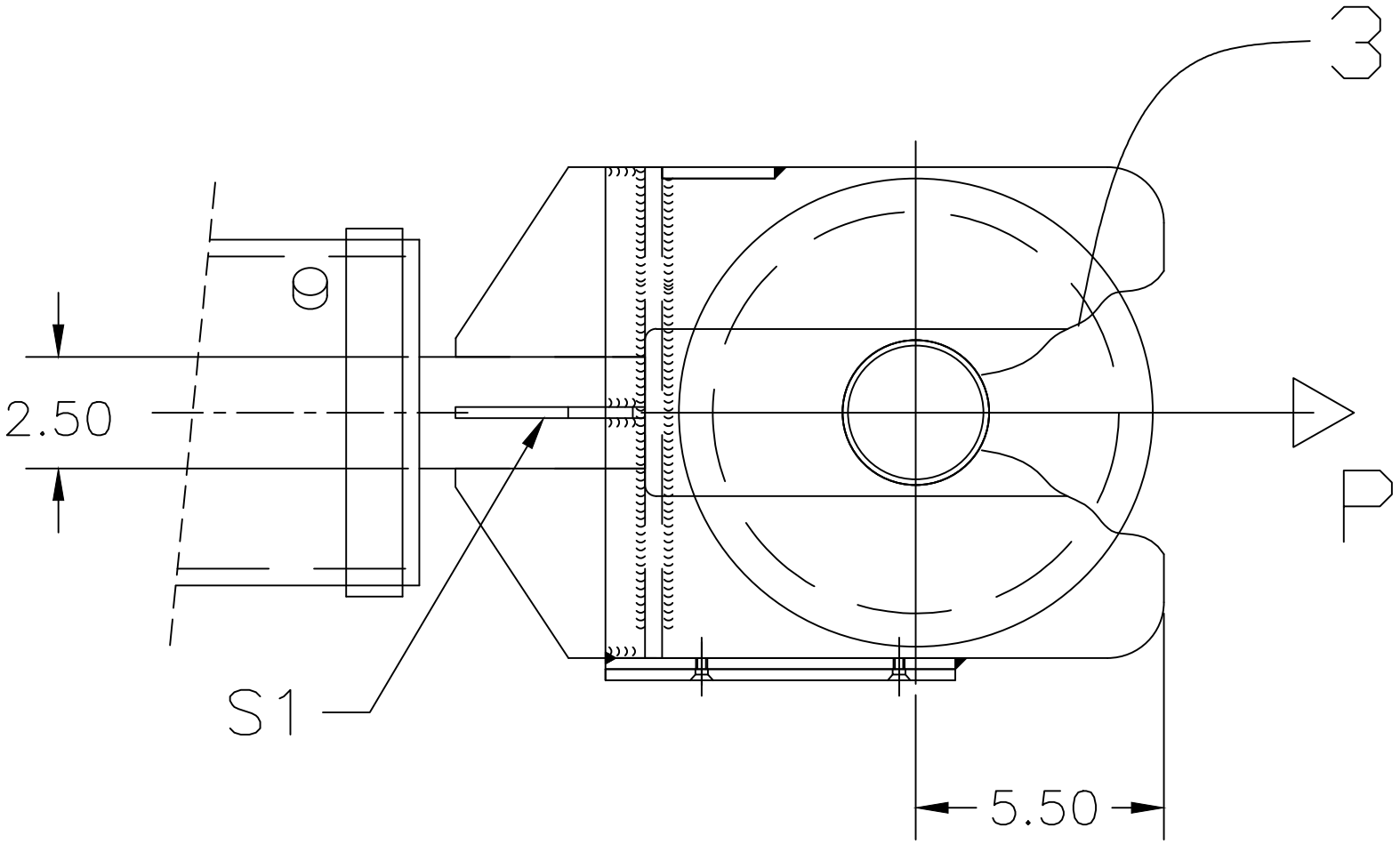
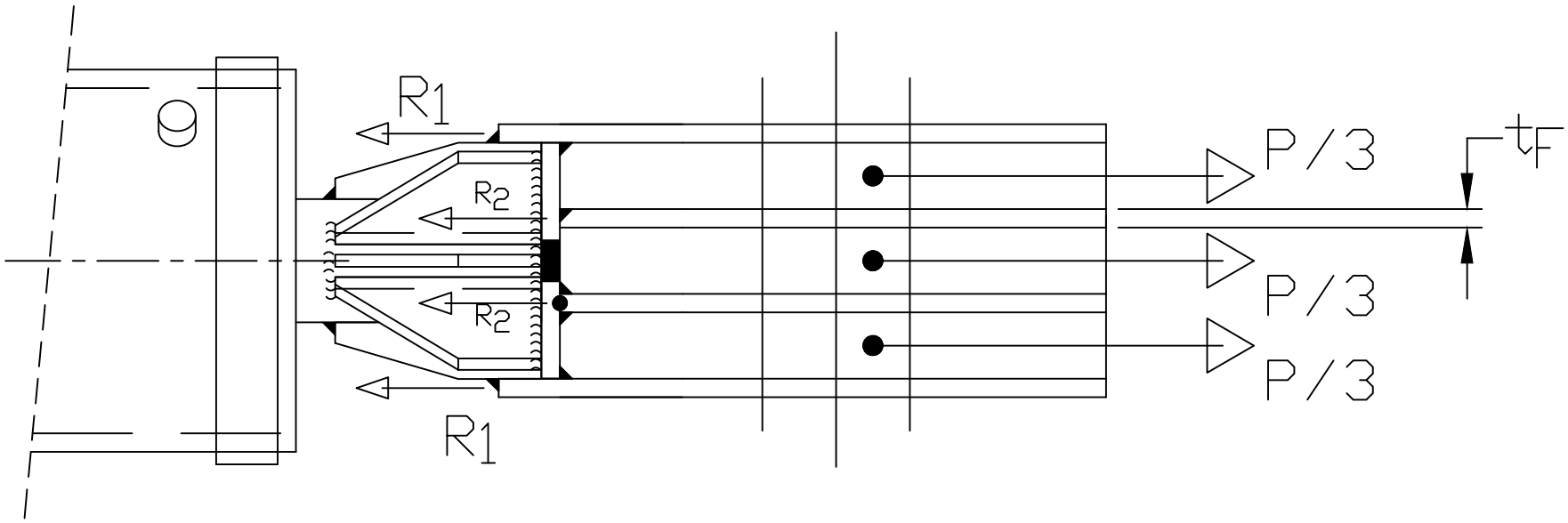


FIGURE H1.0
CABLE HEAD
SIDE VIEW



P/3=87000/3=29,000 LBS

FIGURE H1.0-1
CABLE HEAD
TOP VIEW

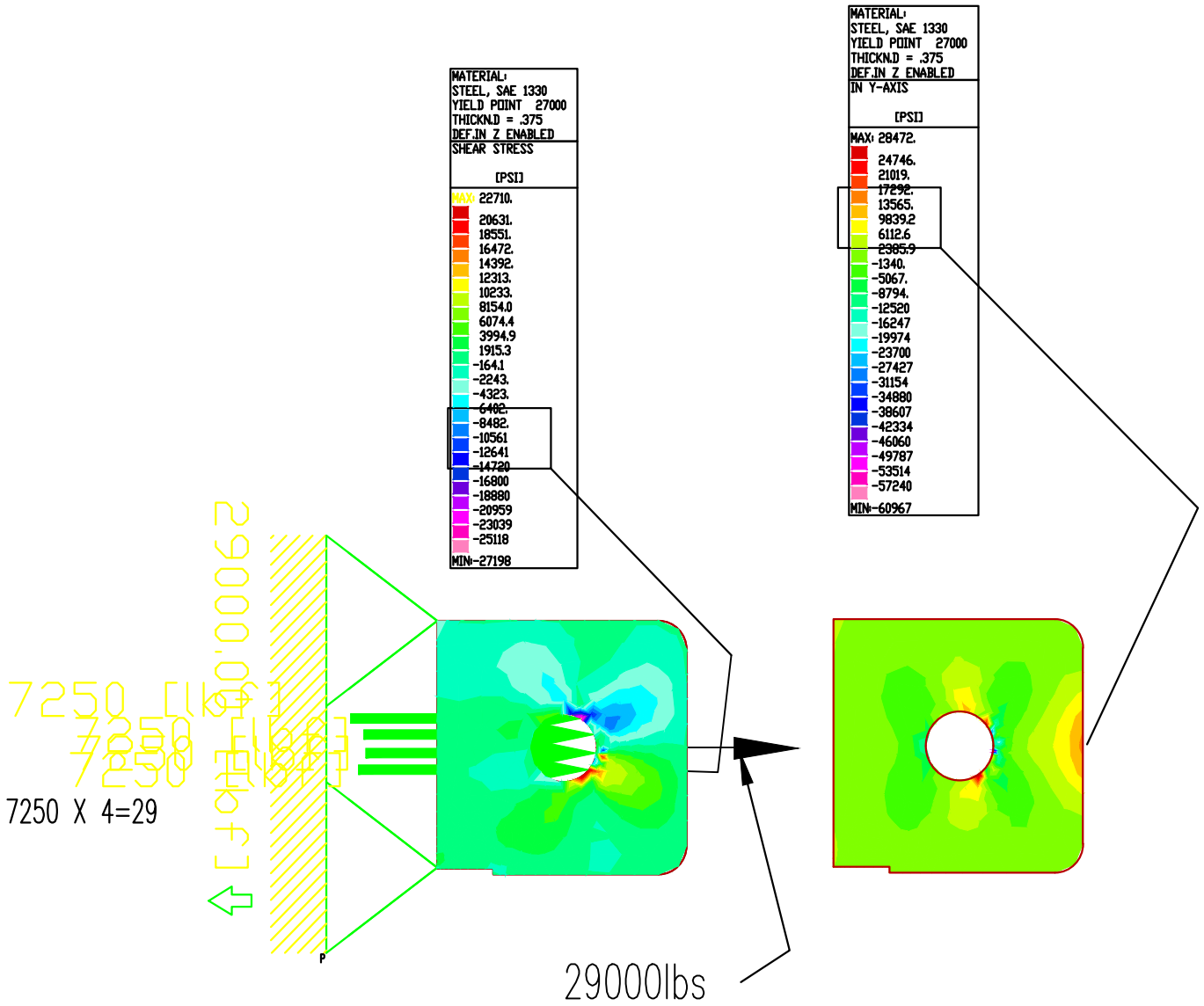


FIGURE H1.2

FEA IN STAINLESS $\frac{3}{8}$ PLATES

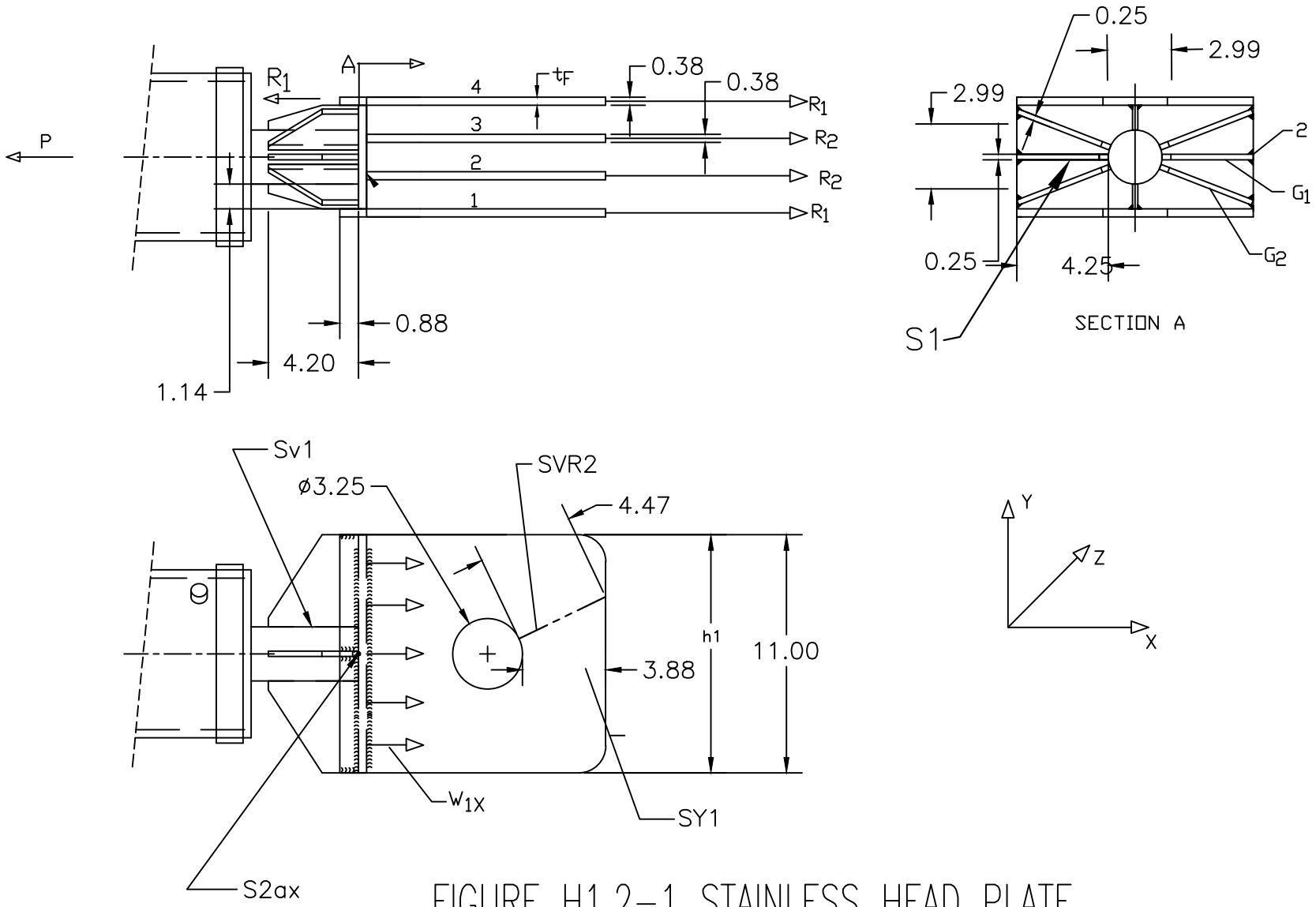


FIGURE H1.2-1 STAINLESS HEAD PLATE STRESSES