Space Weather Observation Mount Analysis

Convert Wind Speed to Pressure (MPH $\rightarrow$ N/m^2)

$P = ½ * \rho_{air} * Cd * V^2$

Assume 75 MPH or 33.528 m/s for V

Assume drag coefficient(Cd) = 1

$\rho_{air} = 1.2\ kg/m^3$

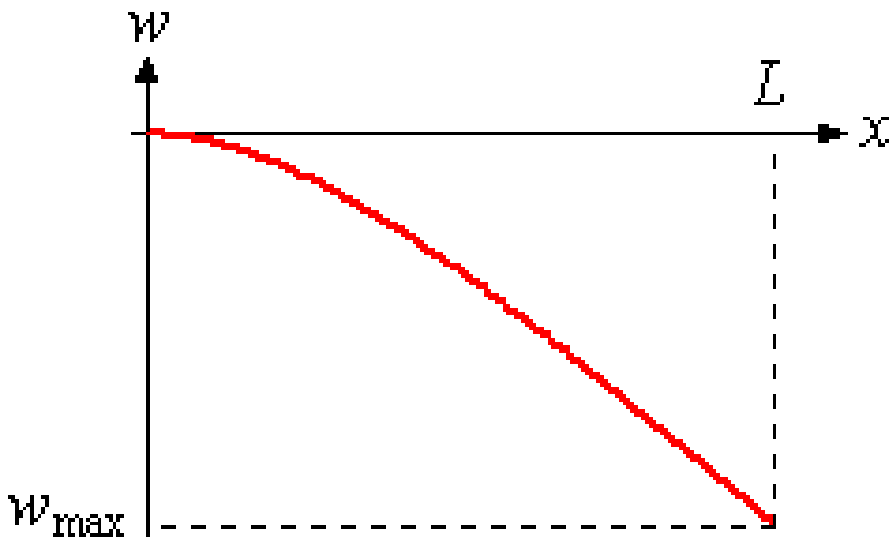
$P = 674.479\ N/m^2$

Deflection Equations

Assuming cantilevered beam for worst case scenario

$$w(x) = -\frac{p\,x^2\left(6\,L^2 - 4\,x\,L + x^2\right)}{24\,EI}$$

$$w_{max} = w(L) = -\frac{p\,L^4}{8\,EI}$$



Maximum Deflection

E = 193 GPA

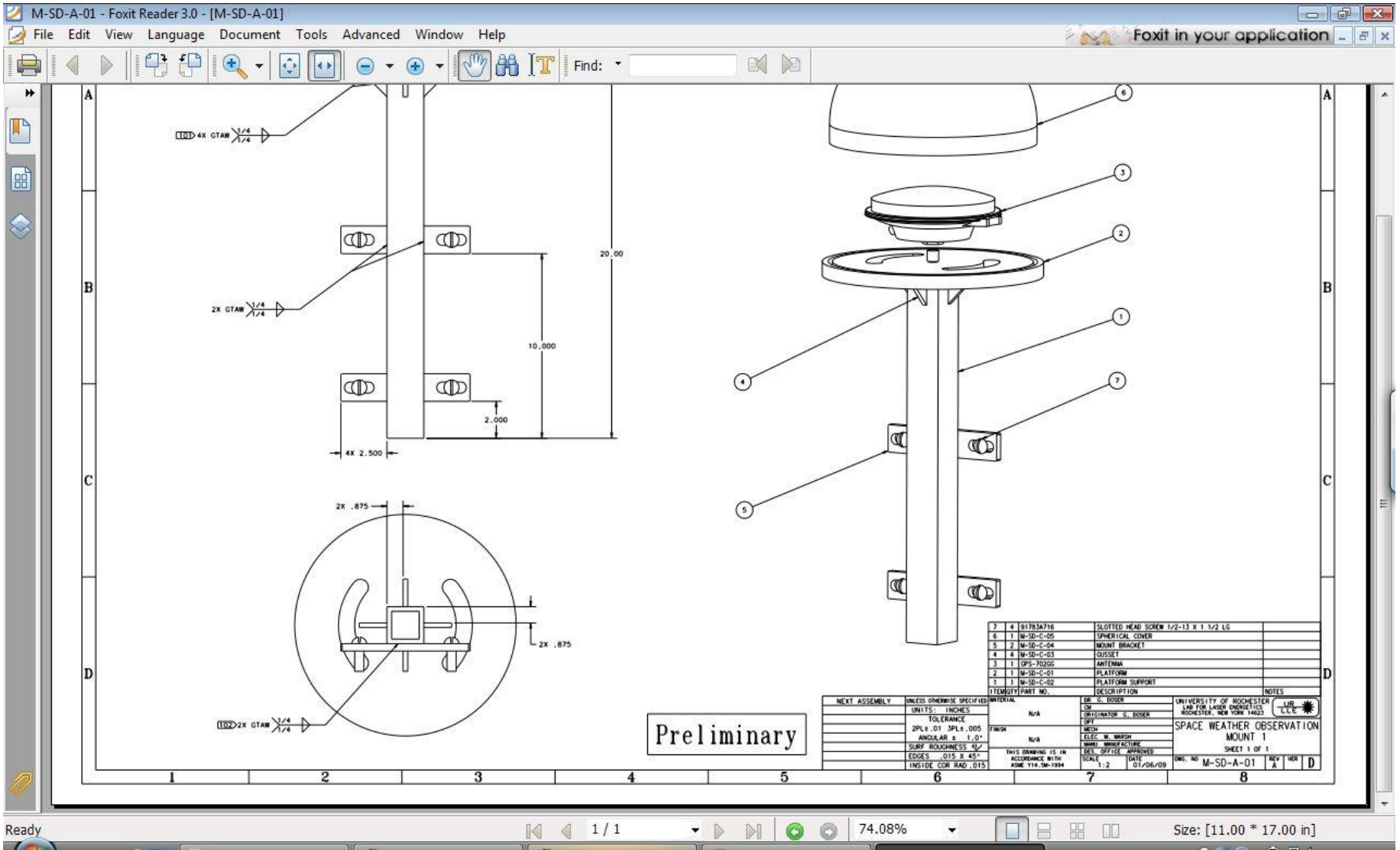
$I = 2.22 \times 10^{-6}\ m^4$

L = .508 m

P_l = P*beam width = 674.476 * 2 = 1348.952 N/m

$W_{max} = 2.62 \times 10^{-5}$

Assembly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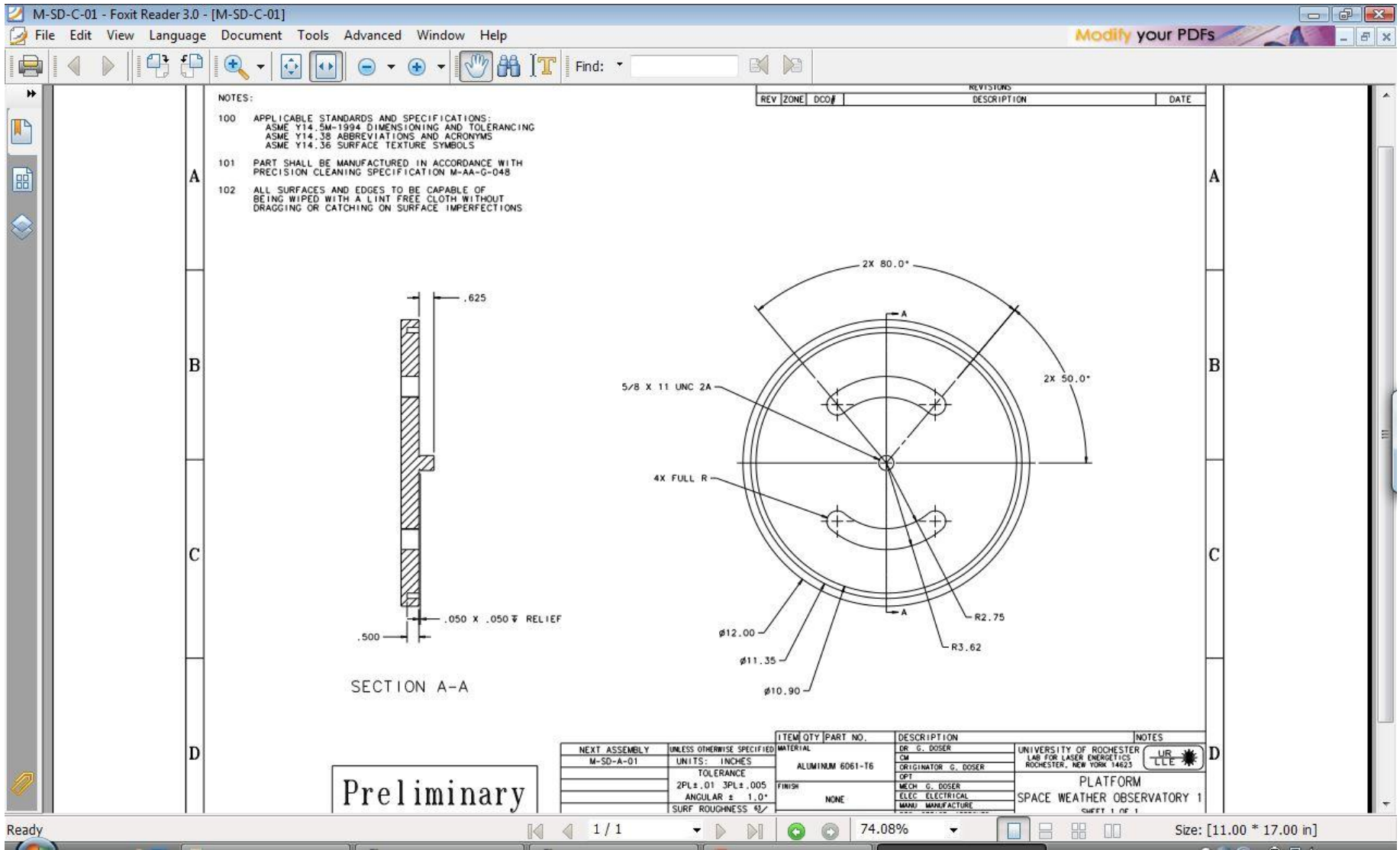
4X GTAW
2X GTAW
20.00
10.000
2.000
4X 2.500
2X .875
2X .875
2X GTAW
Preliminary
SPACE WEATHER OBSERVATION
MOUNT 1
M-SD-A-01
Ready
1 / 1
74.08%
Size: [11.00 * 17.00 in]

Platform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NOTES:
100 APPLICABLE STANDARDS AND SPECIFICATIONS:
ASME Y14.5M-1994 DIMENSIONING AND TOLERANCING
ASME Y14.38 ABBREVIATIONS AND ACRONYMS
ASME Y14.36 SURFACE TEXTURE SYMBOLS
101 PART SHALL BE MANUFACTURED IN ACCORDANCE WITH PRECISION CLEANING SPECIFICATION M-AA-G-048
102 ALL SURFACES AND EDGES TO BE CAPABLE OF BEING WIPED WITH A LINT FREE CLOTH WITHOUT DRAGGING OR CATCHING ON SURFACE IMPERFECTIONS
REVISIONS
REV ZONE DCO# DESCRIPTION DATE
.625
.050 X .050 ∓ RELIEF
.500
SECTION A-A
2X 80.0°
2X 50.0°
5/8 X 11 UNC 2A
4X FULL R
ø12.00
ø11.35
ø10.90
R2.75
R3.62
NEXT ASSEMBLY M-SD-A-01
UNLESS OTHERWISE SPECIFIED
UNITS: INCHES
TOLERANCE
2PL±.01 3PL±.005
ANGULAR ± 1.0°
SURF ROUGHNESS
ITEM QTY PART NO. DESCRIPTION NOTES
MATERIAL ALUMINUM 6061-T6
FINISH NONE
DR G. DOSER
CM
ORIGINATOR G. DOSER
QPT
MECH G. DOSER
ELEC ELECTRICAL
MANU MANUFACTURE
UNIVERSITY OF ROCHESTER
LAB FOR LASER ENERGETICS
ROCHESTER, NEW YORK 14623
PLATFORM
SPACE WEATHER OBSERVATORY 1
Preliminary
Ready
1 / 1
74.08%
Size: [11.00 * 17.00 in]