Zach Swain file hosted at github.com/zswain/MEEG304

1. dia = 15 mm
   length = 100 mm
   material = 1023 carbon steel → E=2.05E11 Pa, v=.29, TS=425MPa, YS=282.7MPa, ρ=7858kg/m^3
   fixed geometries: all non-connecting faces of base
   Force = 100 N
   Torque = 10 Nm
   Max von Mises stress= 4.358E7 Pa
   Mesh: Element size=4.15515mm, Tolerance=.207758mm, nodes=11480, elements=7158

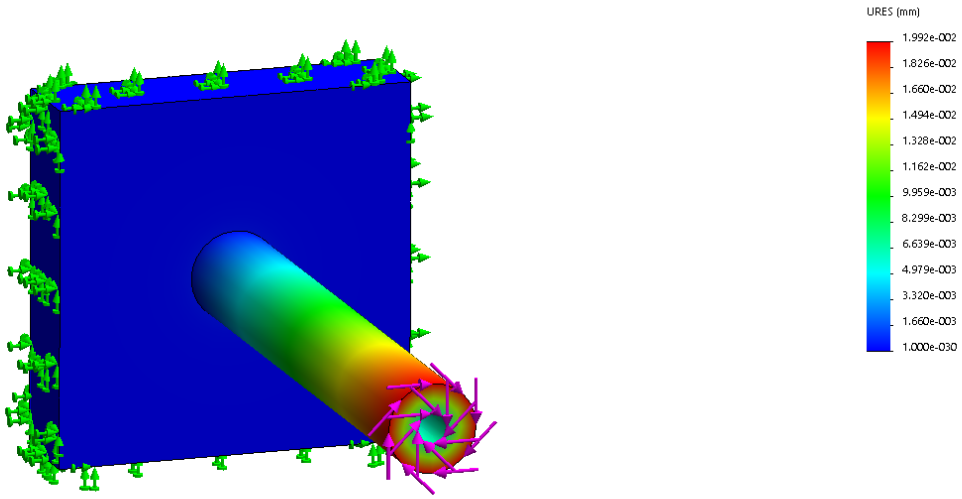
2. Lateral→ 1371554 (N/m)
   Torsional→ 3811 (N/m*rads)
3. **Table 1:** The effects of wall thickness on stiffness and weight are examined.

wall thickness (mm)	Lateral Stiffness (N/m)	Torsional Stiffness (N/m*rads)	weight (kg)
7.5	1371553.971	3810.976	1.362
5.000	1350621.286	3765.060241	1.211
2.500	1059771.089	3083.881579	0.757

4. **Table 2:** The effects of fillet radius on stiffness and weight are examined.

fillet radius (mm)	Lateral Stiffness (N/m)	Torsional Stiffness (N/m*rads)	weight (kg)
0	1371553.971	3810.976	1.362
5.000	1483459.427	3898.128898	1.362
7.500	1560305.82	3964.059197	1.362

5. **Figure 1:** The torsional loading condition is visualized upon the beam of 5 mm wall thickness.



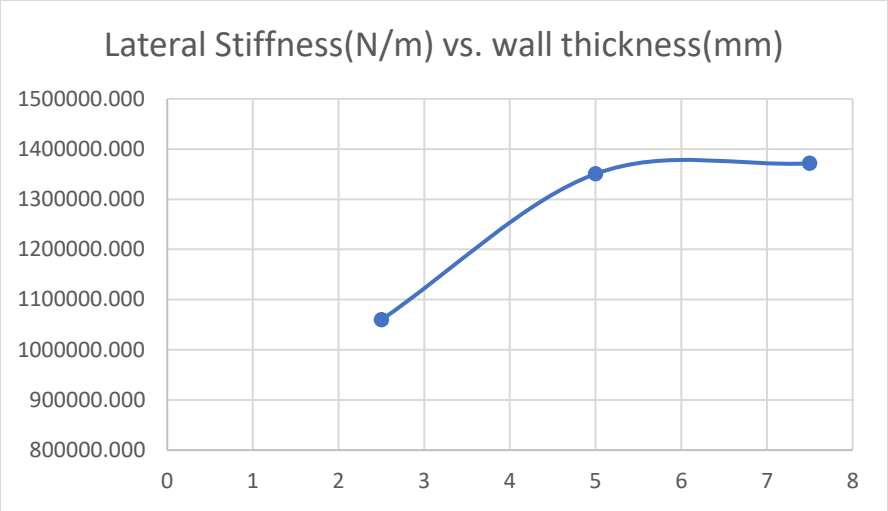


Figure 2: The effects of the wall thickness on lateral stiffness are plotted.

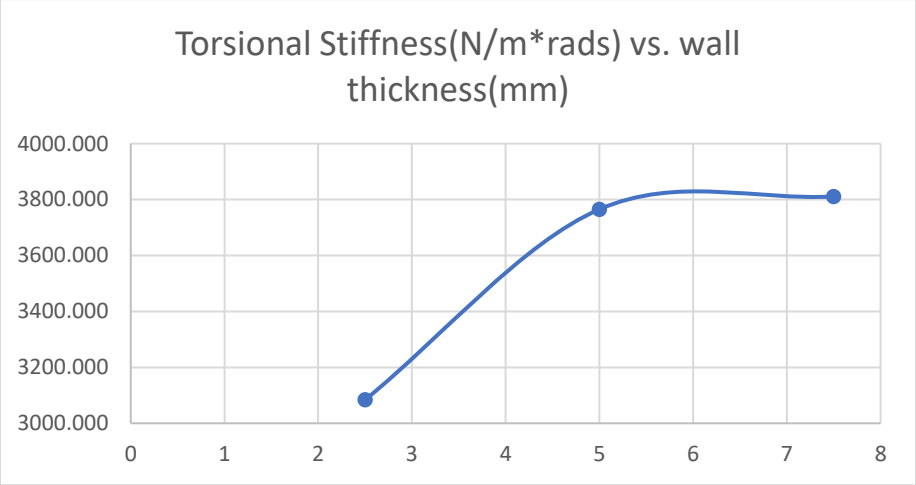


Figure 3: The effects of the wall thickness on torsional stiffness are plotted.

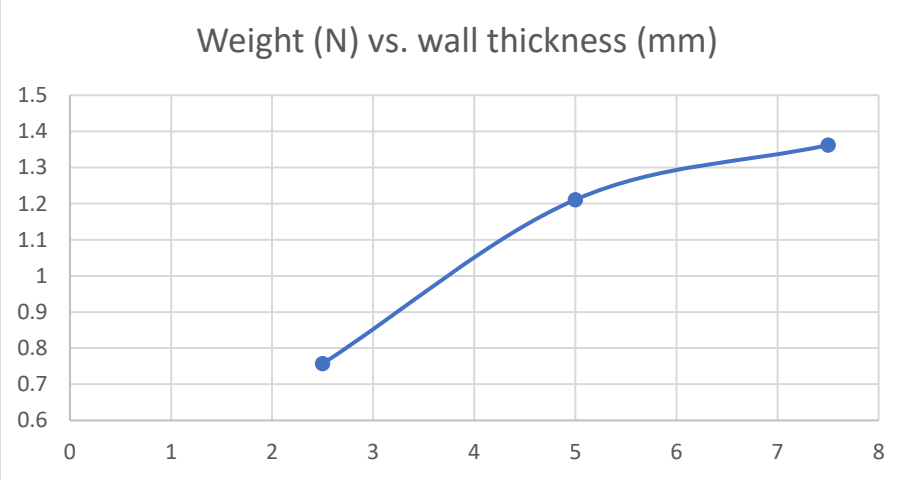


Figure 4: The effects of the wall thickness on weight are plotted.

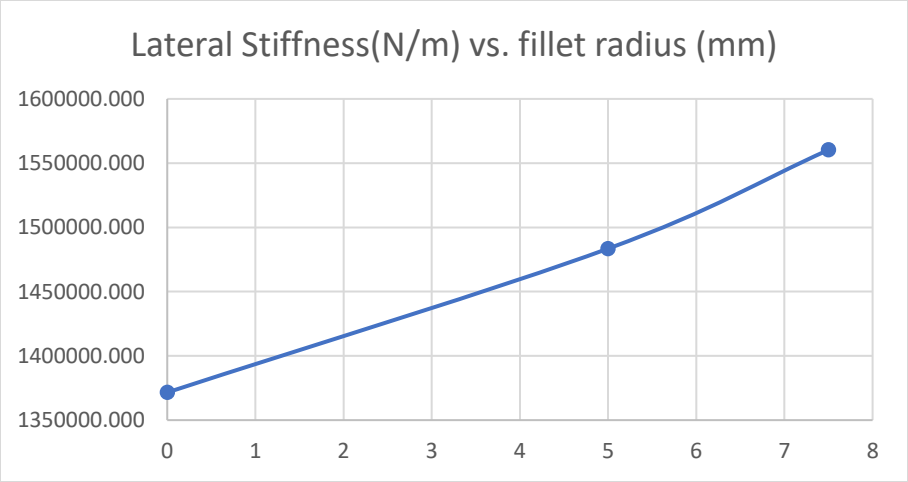


Figure 5: The effects of the fillet radius on lateral stiffness are plotted.

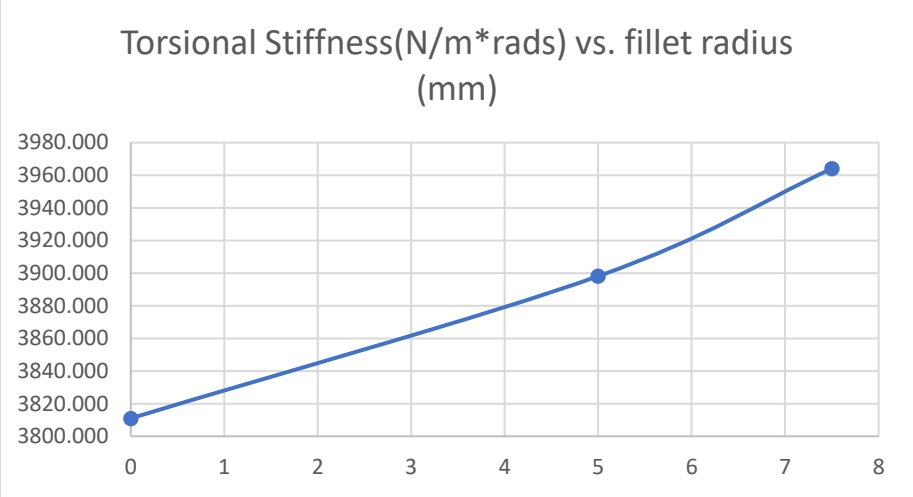


Figure 6: The effects of the fillet radius on torsional stiffness are plotted.

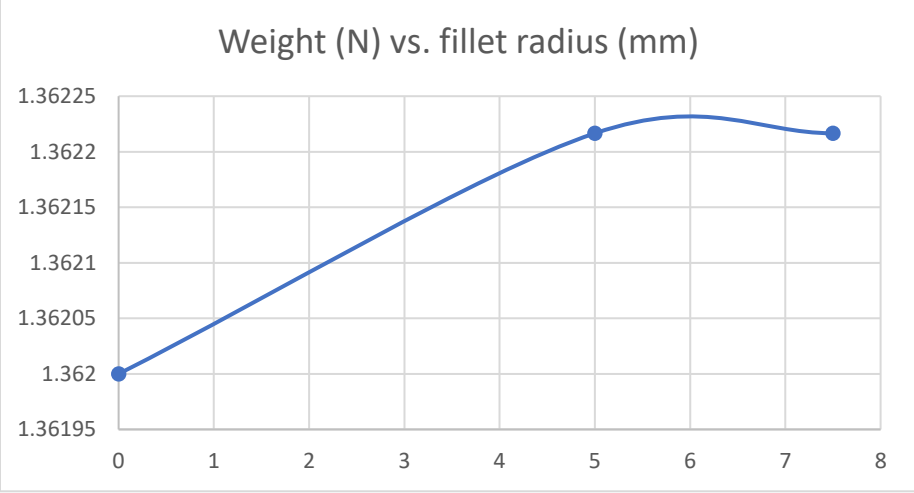


Figure 8: The effects of the fillet radius on weight are plotted.