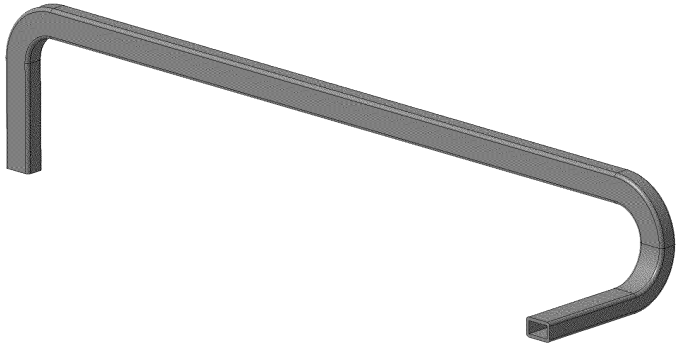
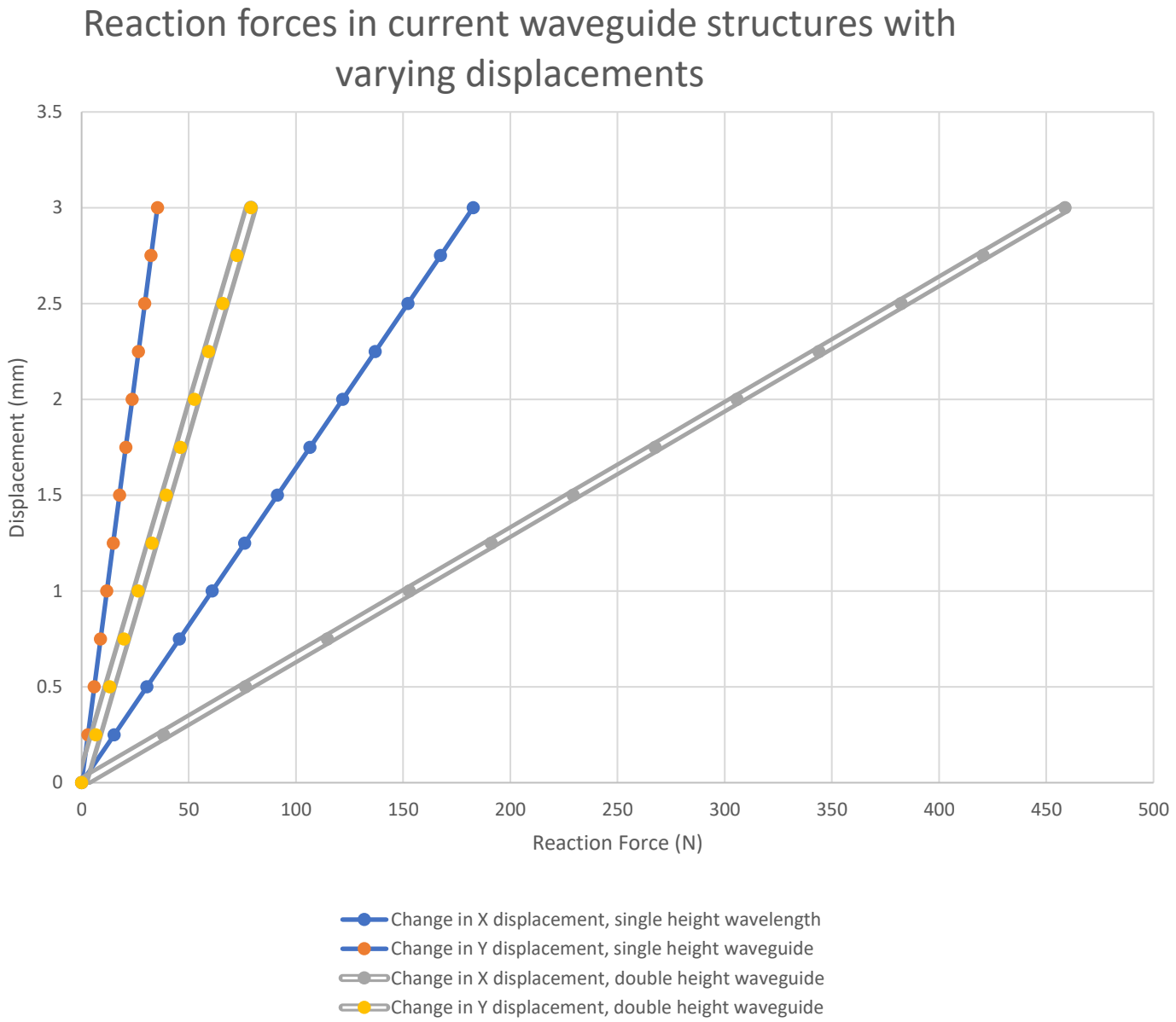
Waveguide Configurations

Joshua Brown



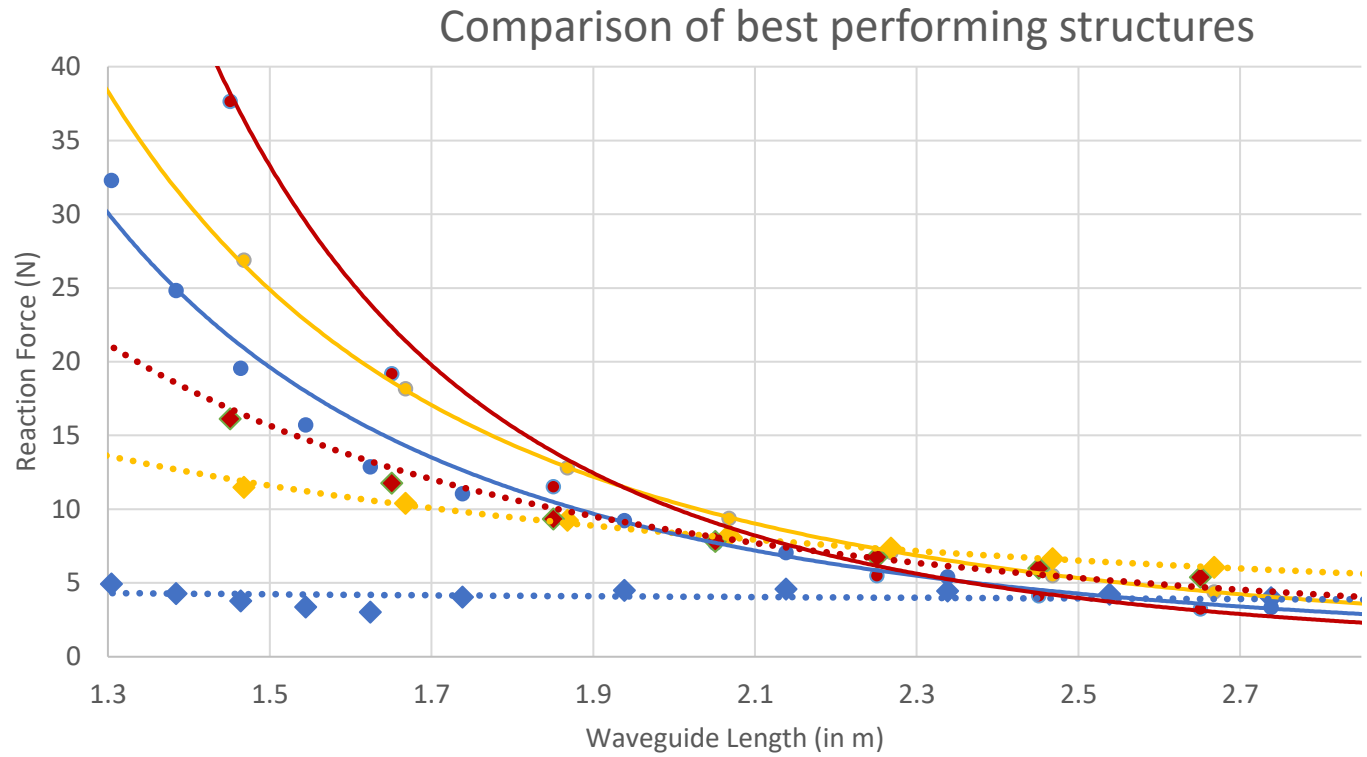
- Threshold to hit 20N reaction forces in single and double-height waveguides:

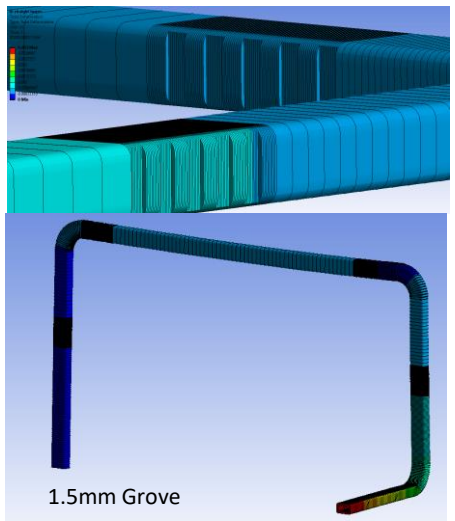
  - 0.3mm for Single Height
  - 0.15mm for Double Height

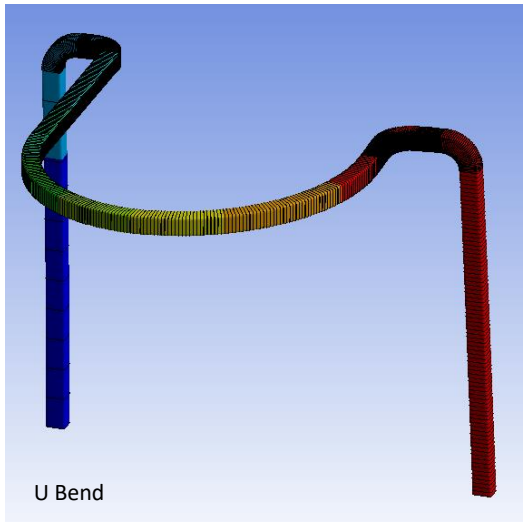


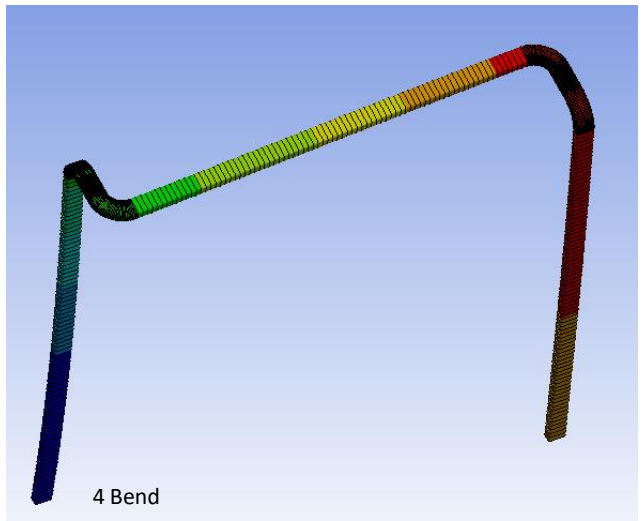
1mm Displacement 2 Beam Scenarios

- Threshold to hit 20N reaction forces drops to <1.5m
- U Bend design becomes more efficient after 2.36m



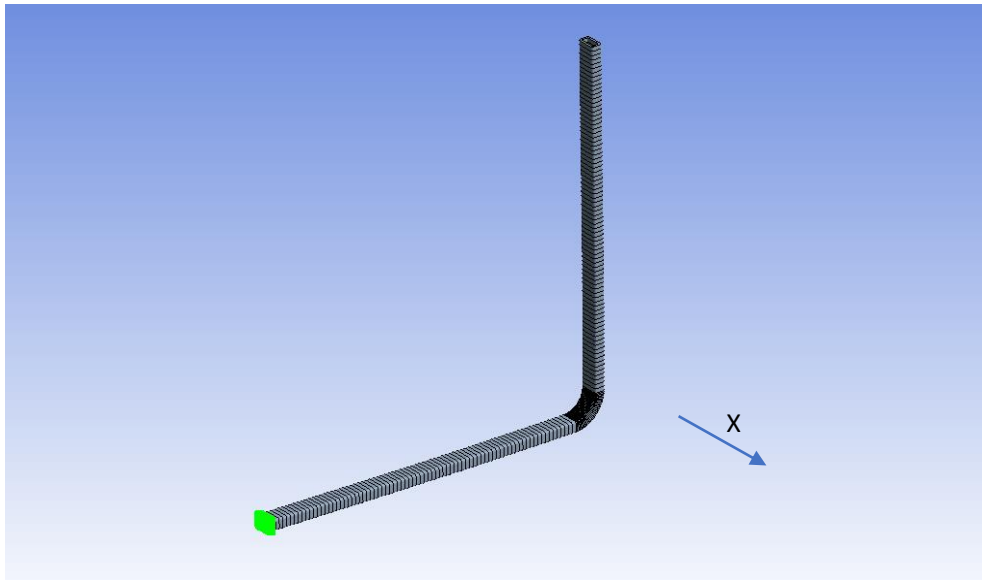


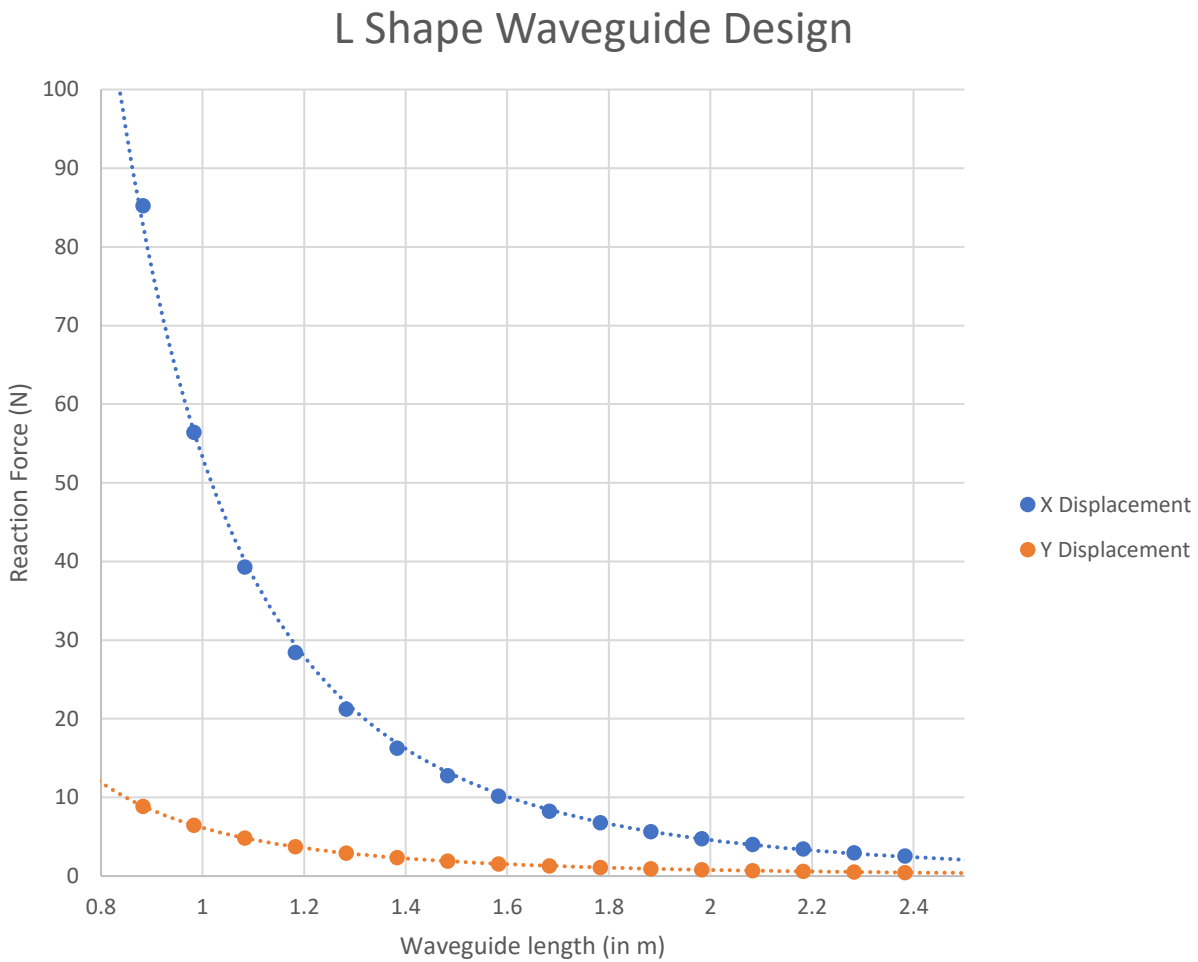


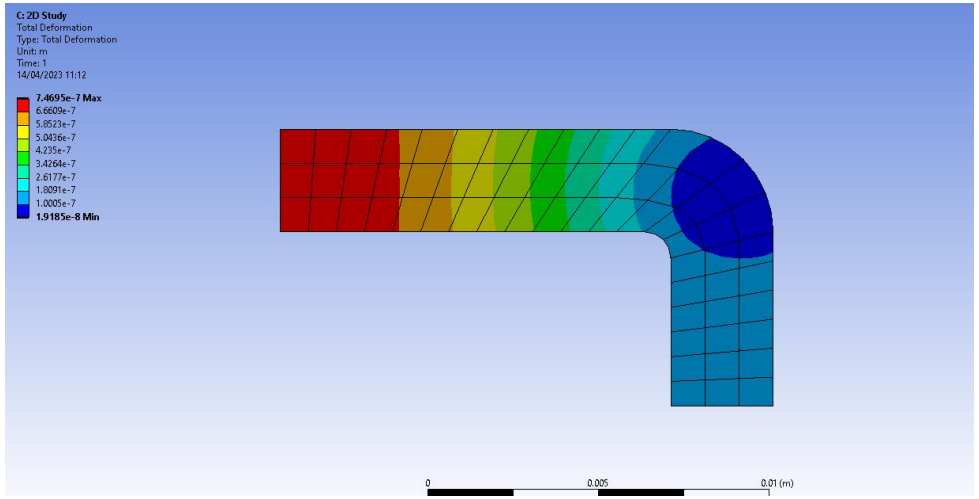


- L Shape waveguide design to produce 20N at only 1.1 m in length

- Achieves 20N criteria with only one bend and with 40cm less waveguide than the U Bend



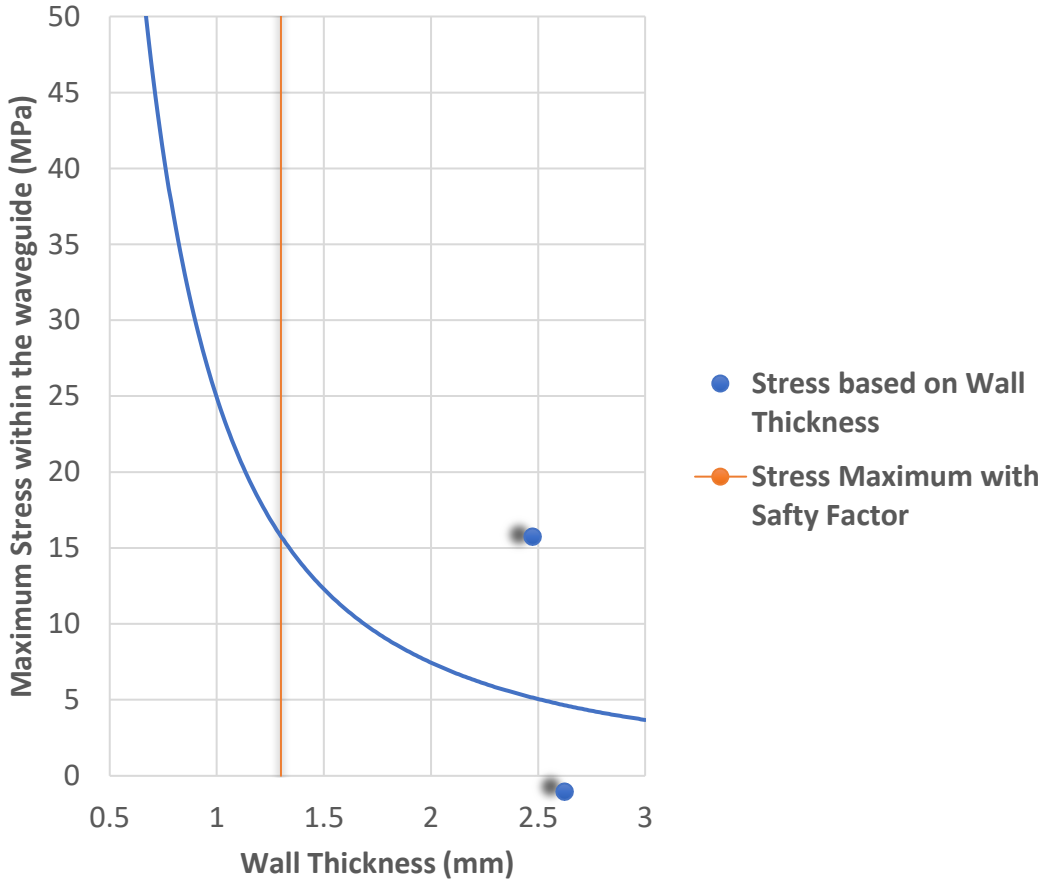




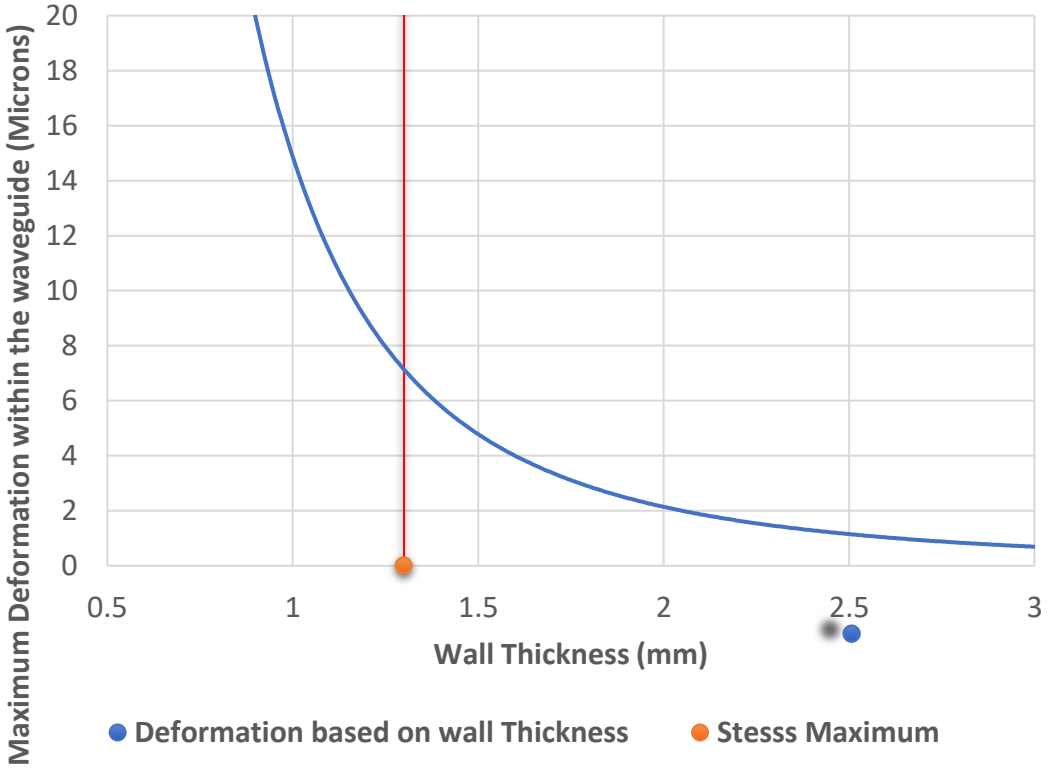
Changing the waveguide thickness

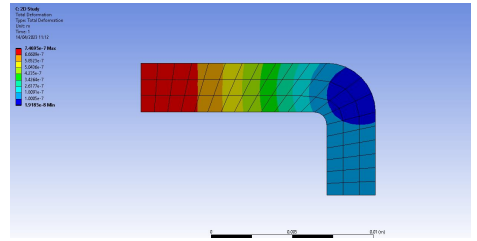
- Current waveguide thickness is 3mm in order to support the pressure differential across the waveguide without changing the internal geometry
- Simulations suggest this could be changed to 2mm

Max stress based on Wall Thickness

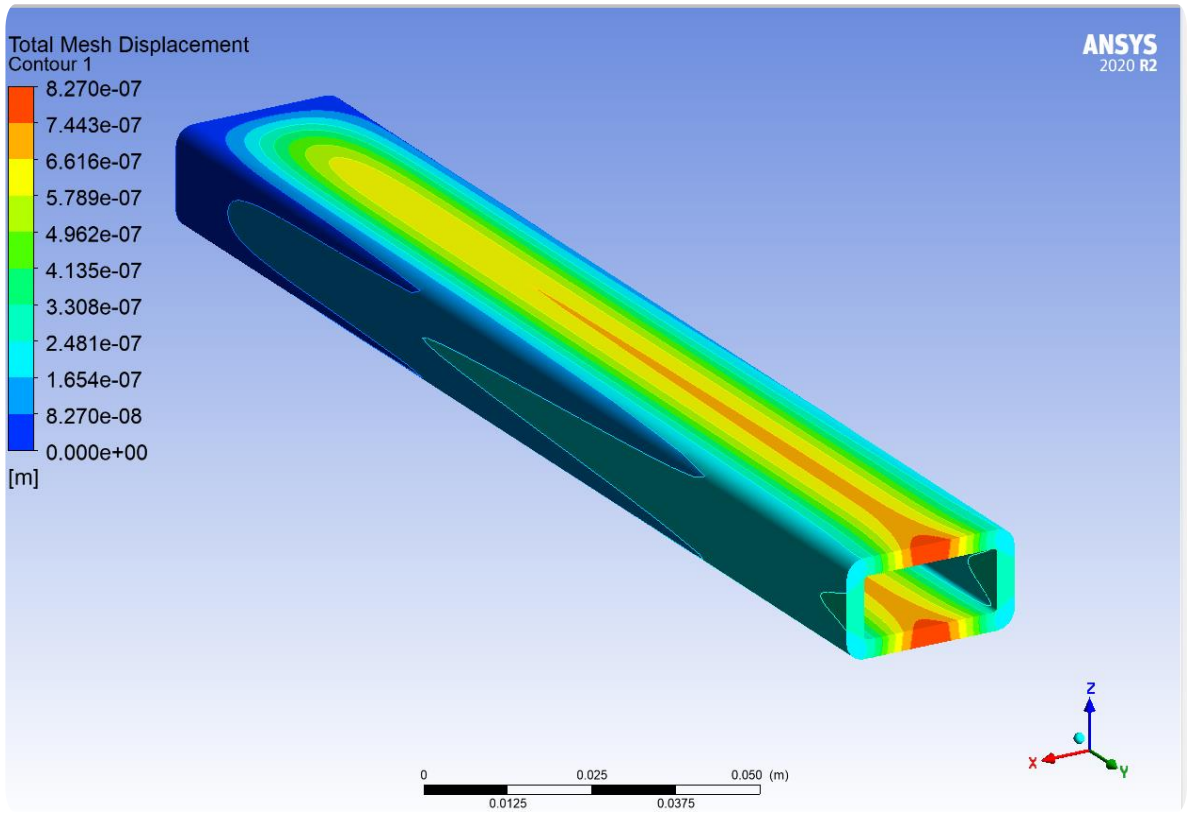


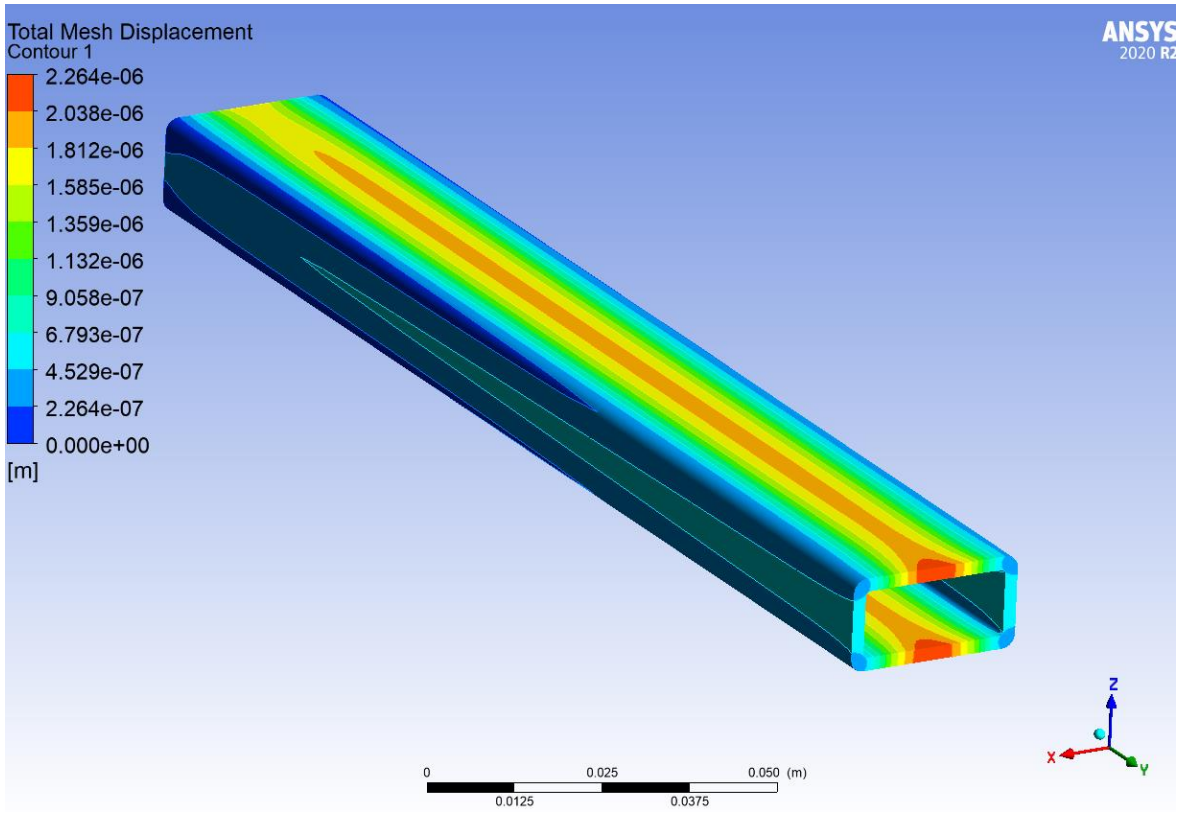
Maximum Deformation based on Wallthinckness under 1 Bar of Pressure





- Assuming a stress maximum of approximately half of the yield stress
- Limiting factor is mainly the deformation of the internal geometry

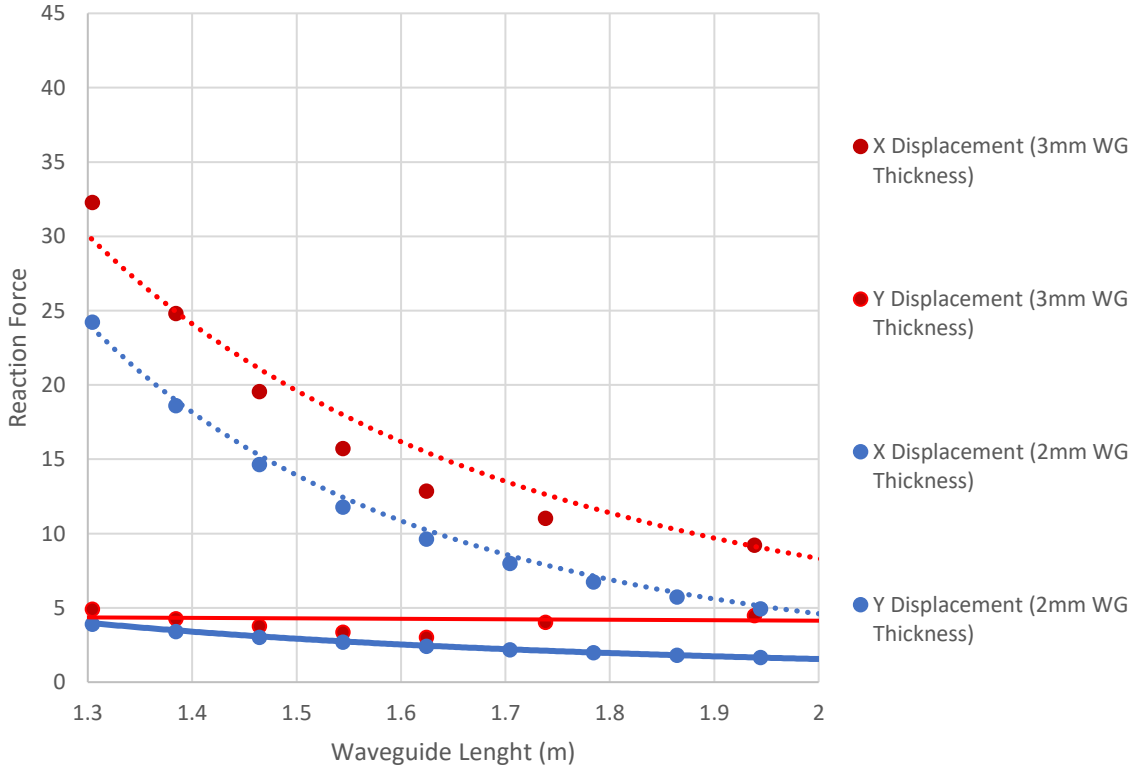




- Verification study using a 400mm length, 3mm thickness waveguide

- Simulation shows that the 3D model approximately aligns with the 2D model when constrained at one end

U bend - 2/3mm Comparison



Waveguide Lengths can be reduced to

- <1.4m U-Bend
- <0.9m L-bend

L Shape Waveguide Design