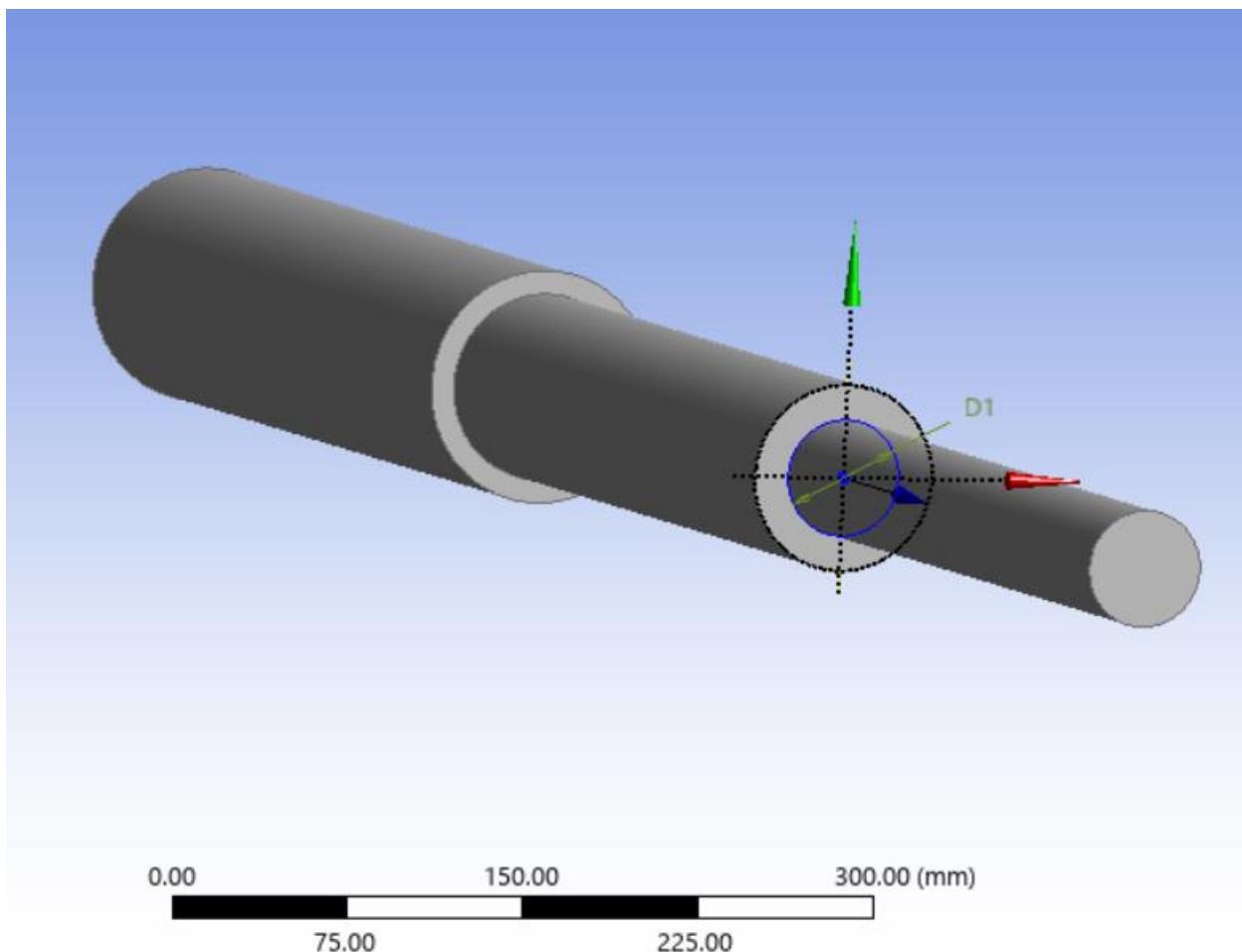


Project 23: ANSYS Static Structural: Torsion applied to a bar

Problem Statement: Calculate the deformation and moment reaction for a bar under torsion.

Geometry:



## Material Properties:

Structural Steel

Fatigue Data at zero mean stress comes from 1998 ASME BPV Code, Section 8, Div 2, Table 5-110.1

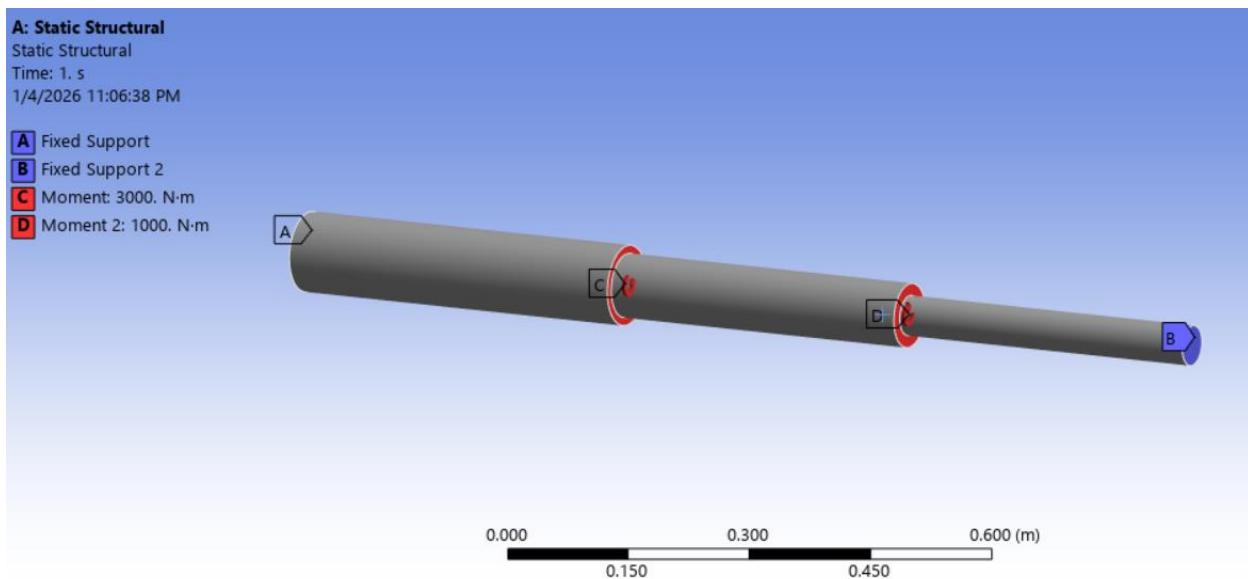
Click here to add a new material

Properties of Outline Row 3: Structural Steel

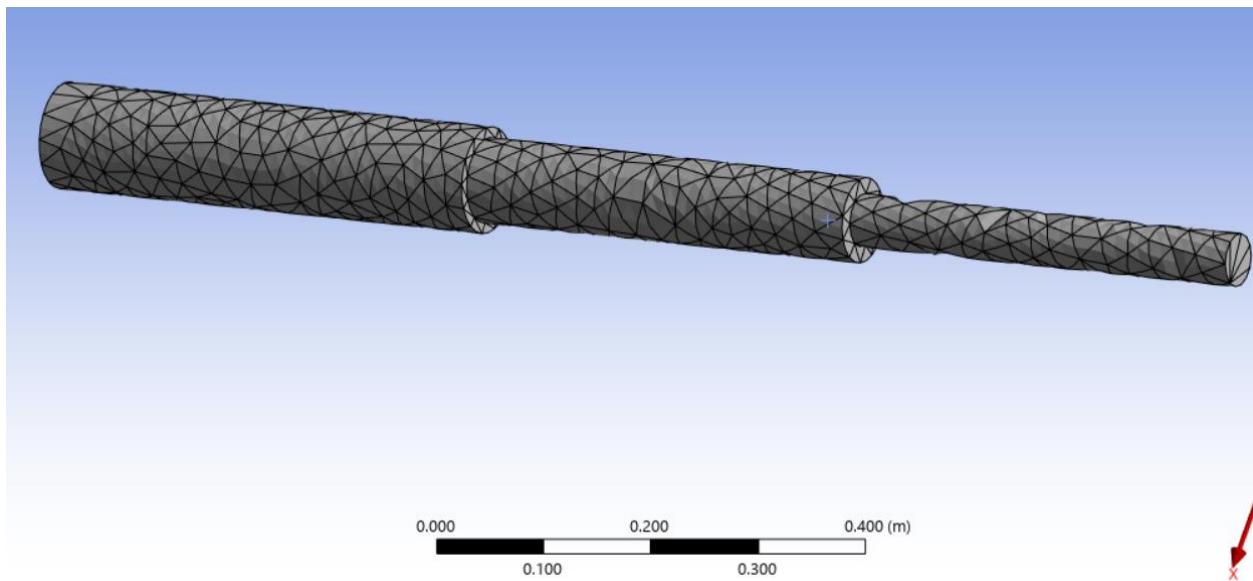
	A	B	C	D	E
1	Property	Value	Unit	X	Y
3	Density	7850	kg m^-3		
4	Isotropic Secant Coefficient of Thermal Expansion				
6	Isotropic Elasticity				
7	Derive from	Young's Modulus a...			
8	Young's Modulus	2E+11	Pa		
9	Poisson's Ratio	0.3			
10	Bulk Modulus	1.6667E+11	Pa		
11	Shear Modulus	7.6923E+10	Pa		
12	Strain-Life Parameters				
20	S-N Curve	Tabular			
24	Tensile Yield Strength	2.5E+08	Pa		
25	Compressive Yield Strength	2.5E+08	Pa		
26	Tensile Ultimate Strength	4.6E+08	Pa		
27	Compressive Ultimate Strength	0	Pa		

Boundary Conditions:

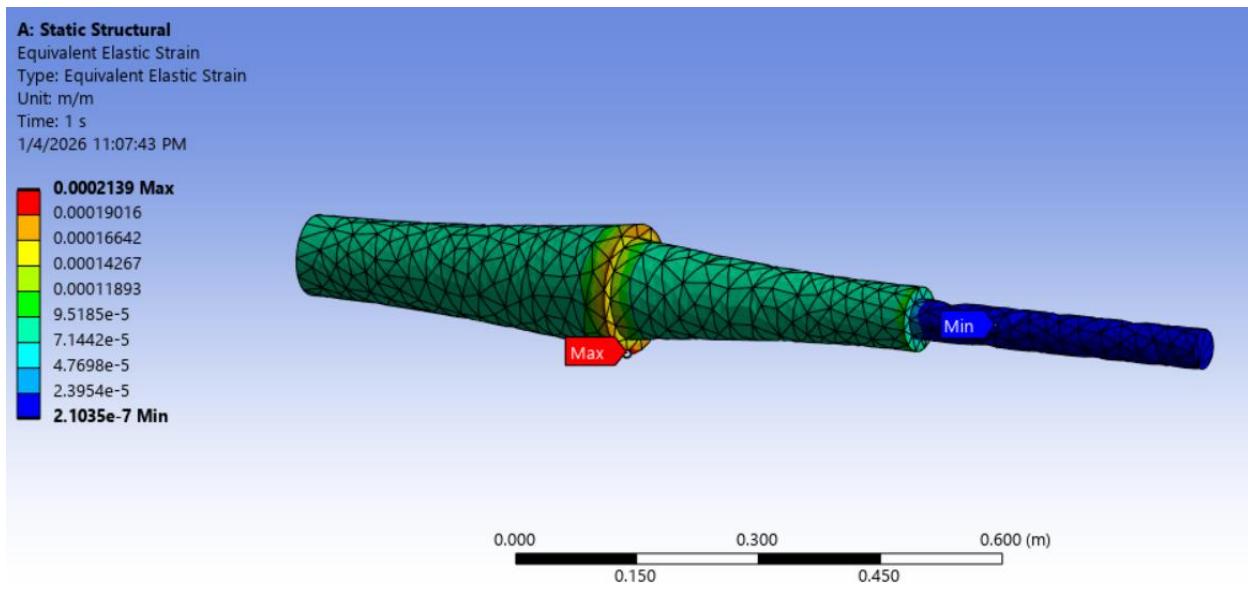
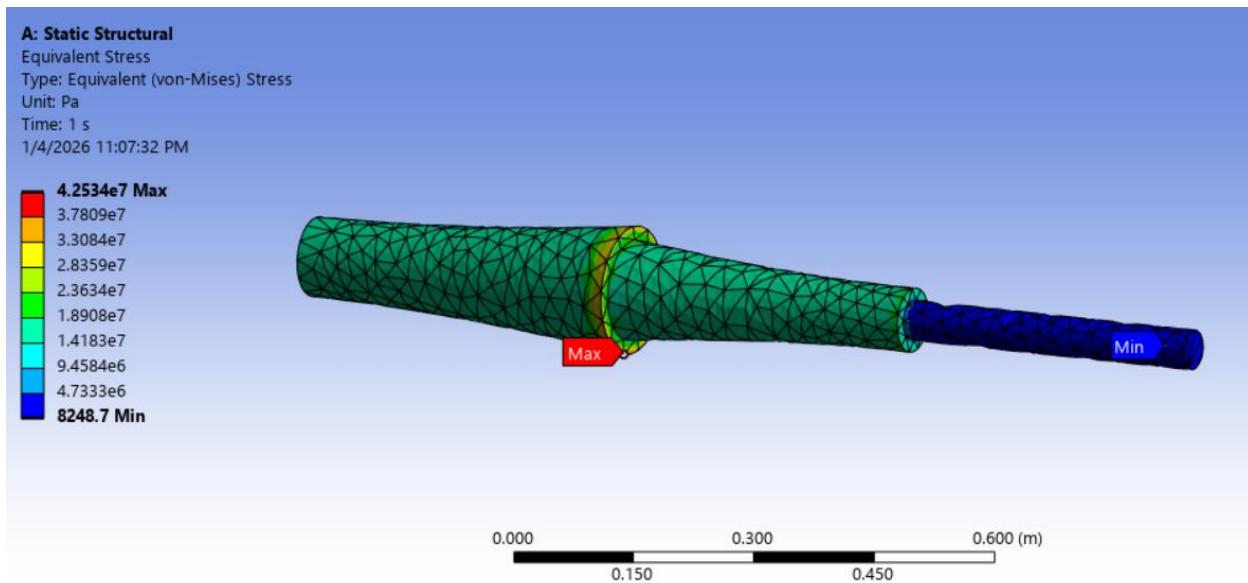
Left and right edges are fixed. Moments are applied in two points.



Mesh:

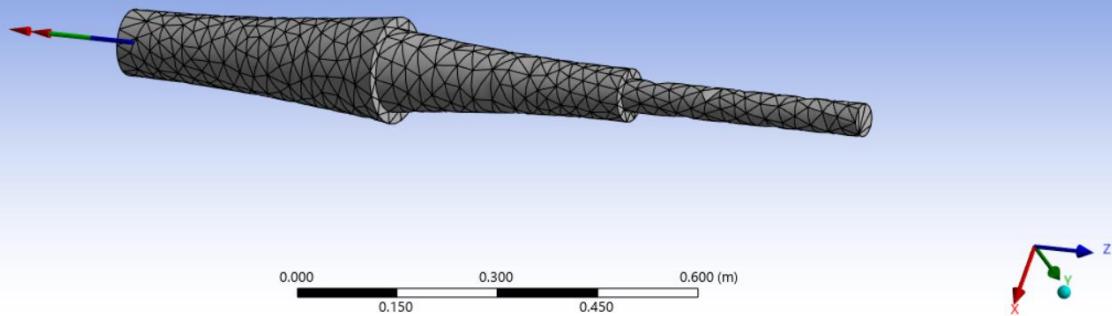


## Results: Deformation, stress, strain, and moment reactions.



**A: Static Structural**  
Moment Reaction  
1/4/2026 11:07:57 PM

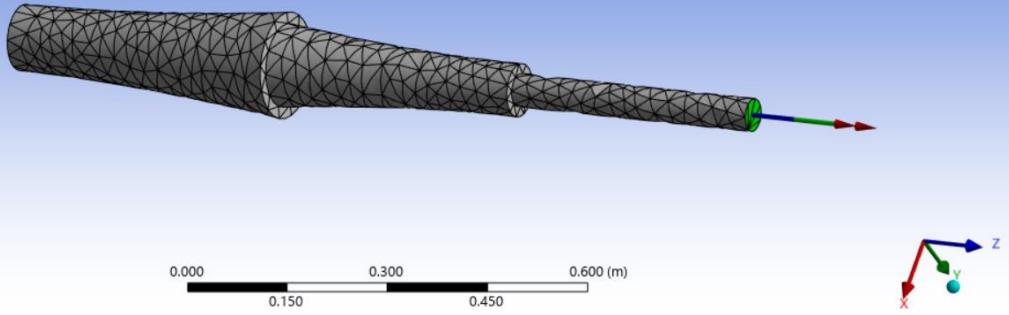
**Ansys**  
2025 R2  
**STUDENT**



Time [s]	Moment Reaction (X) [N-m]	Moment Reaction (Y) [N-m]	Moment Reaction (Z) [N-m]	Moment Reaction (Total) [N-m]
1. 1.	3.9973e-002	8.0179e-002	-2010.7	2010.7

**A: Static Structural**  
Moment Reaction 2  
1/4/2026 11:08:15 PM

**Ansys**  
2025 R2  
**STUDENT**



Time [s]	Moment Reaction 2 (X) [N-m]	Moment Reaction 2 (Y) [N-m]	Moment Reaction 2 (Z) [N-m]	Moment Reaction 2 (Total) [N-m]
1. 1.	1.3187e-002	-1.49e-004	10.694	10.694

