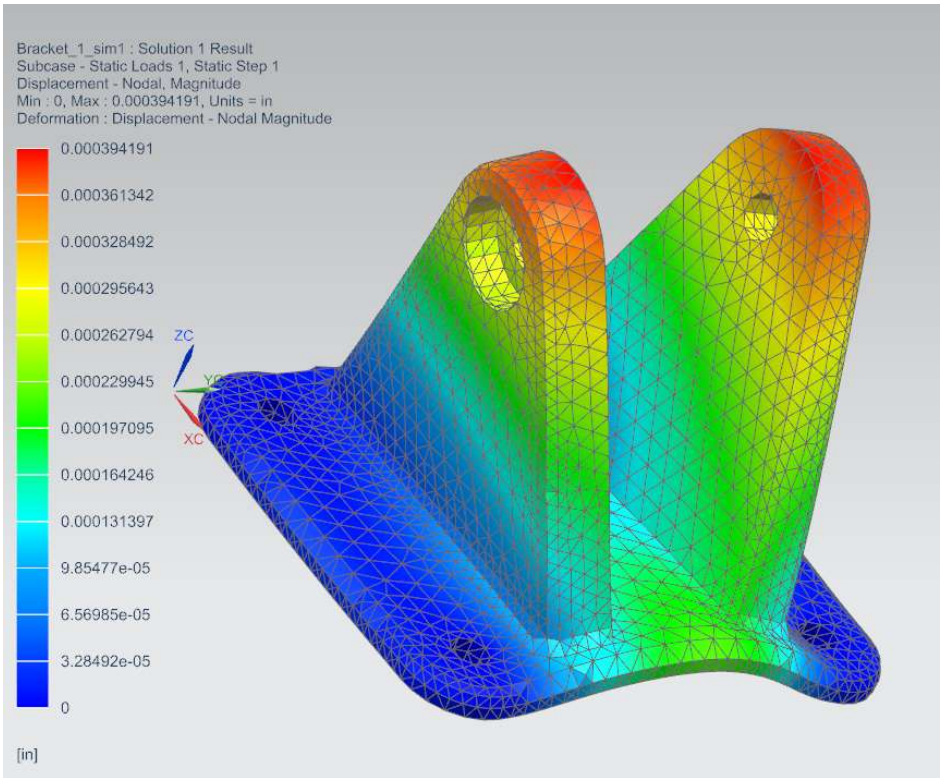
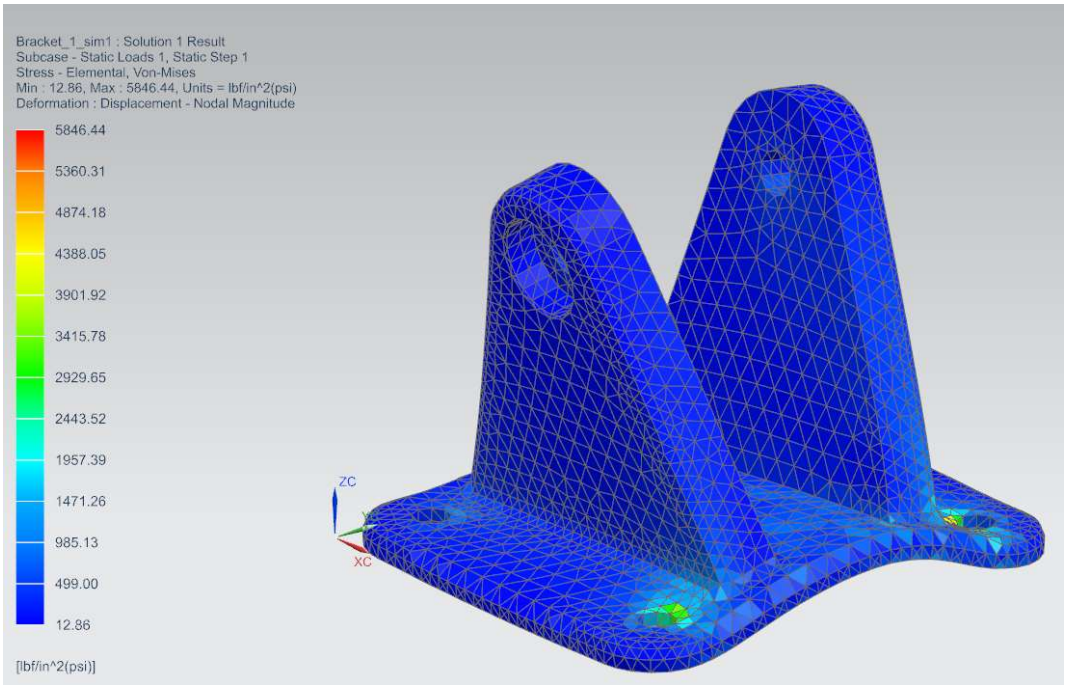
Linear Static Analysis of Bracket

Element size = Tetra 4, element size = .25 in

Displacement = 0.000394191 in

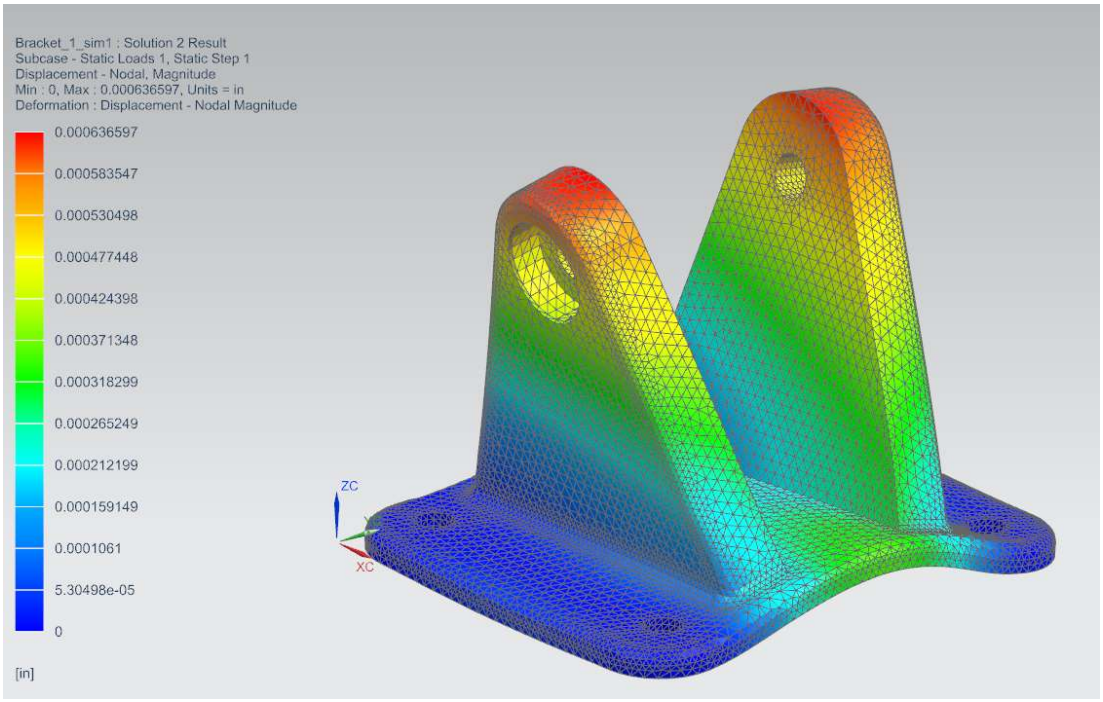


Von-Mises Stress = 2076.76 lbf/in^2 (psi)

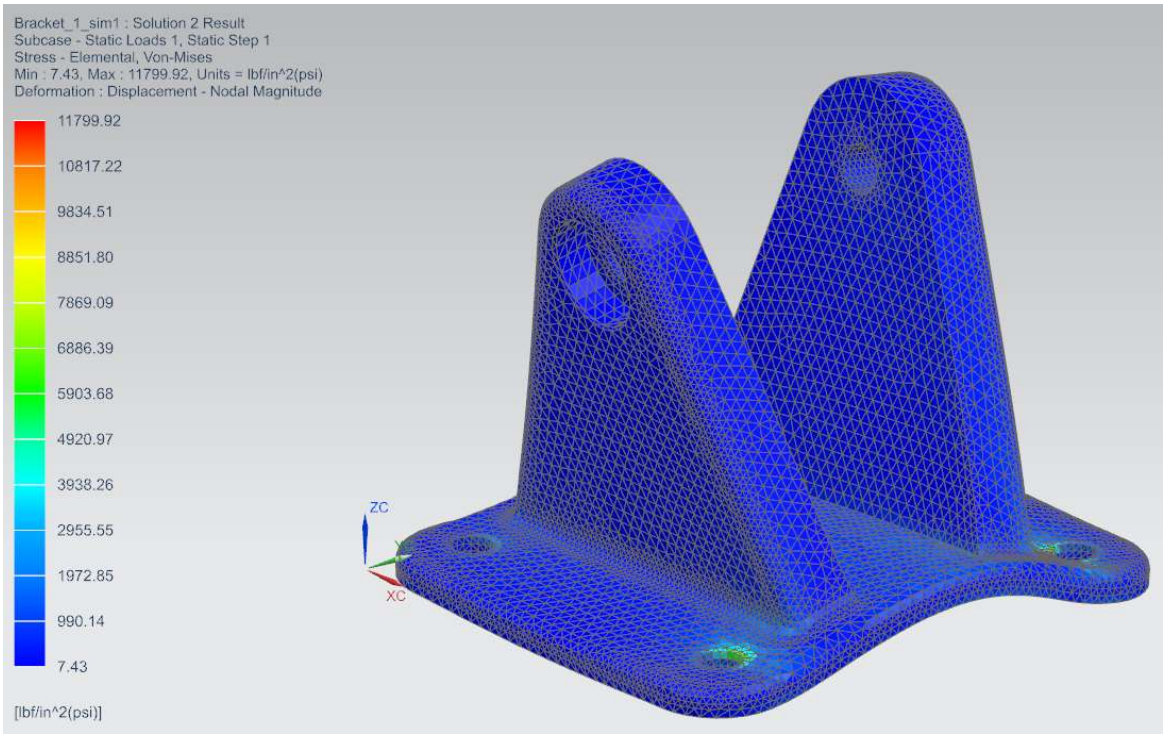


Element size = Tetra 4, element size = .125 in

Displacement = 0.000636597 in

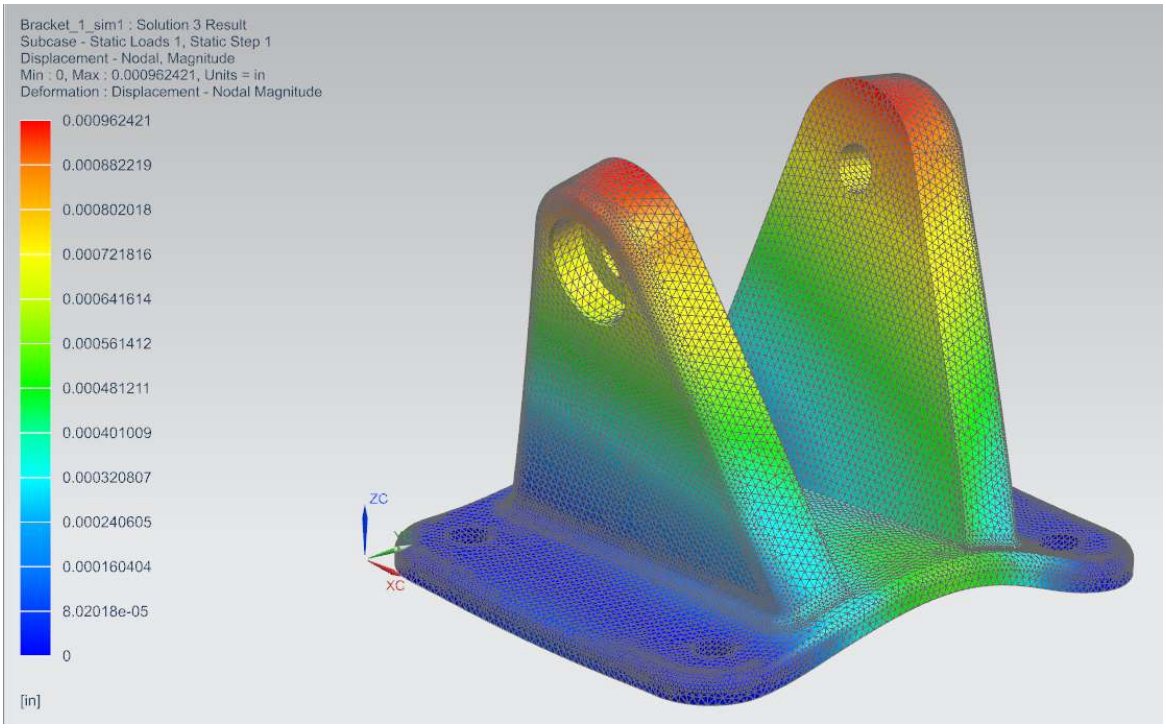


Von-Mises Stress = 2475.47 lbf/in^2 (psi)

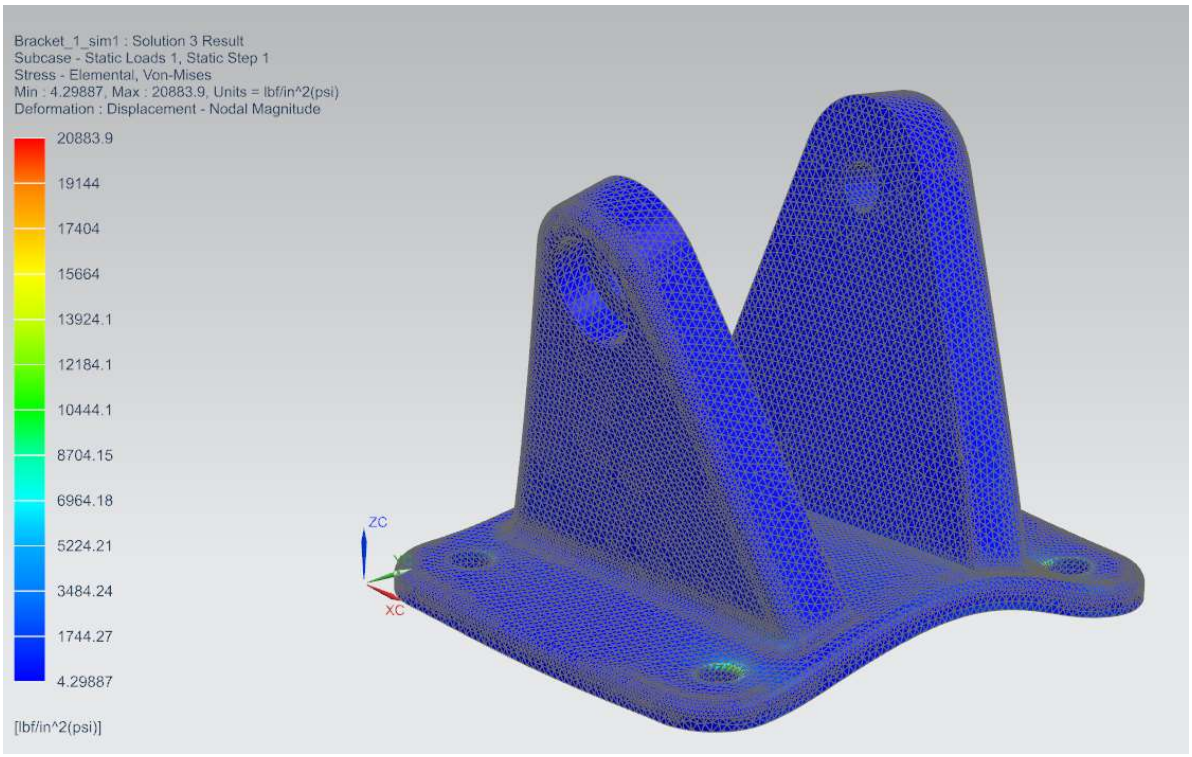


Element size = Tetra 10, element size = .125 in

Displacement = 0.000962421 in

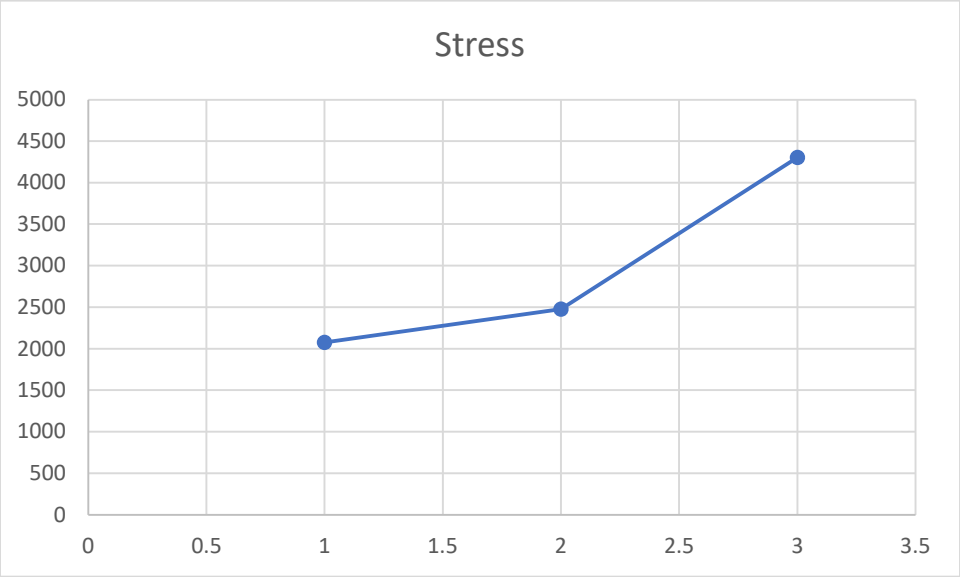


Von-Mises Stress = 4304.19 lbf/in^2 (psi)



Bracket		
	Element sizes	Stress
1	0.25	2076.76
2	0.125	**2475.47**
3	0.08	4304.19

Convergence Plot



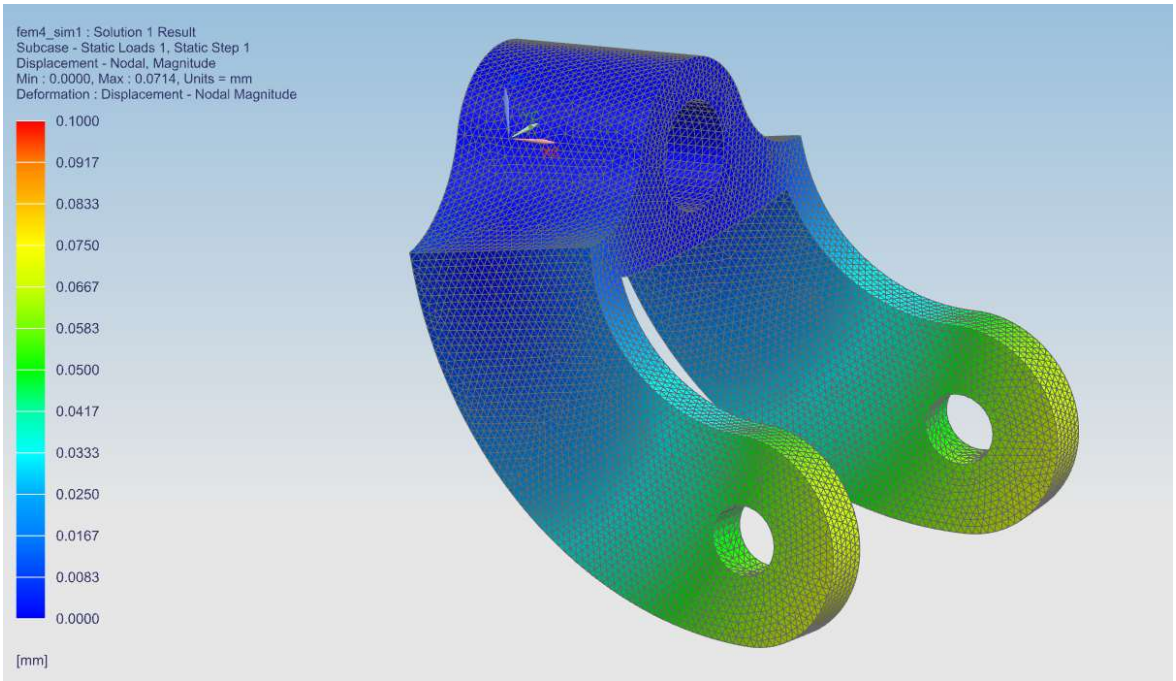
1. What are the maximum deflection and the maximum stress for each of the four cases?

Sr No	Element Size	Max deflection (in)	Max Stress (lbf/in^2)
1	Tetra(4), .25 in	0.000394191	**2076.76**
2	Tetra(4), .125 in	0.000636597	**2475.47**
3	Tetra(10), .08 in	0.000962421	**4304.19**

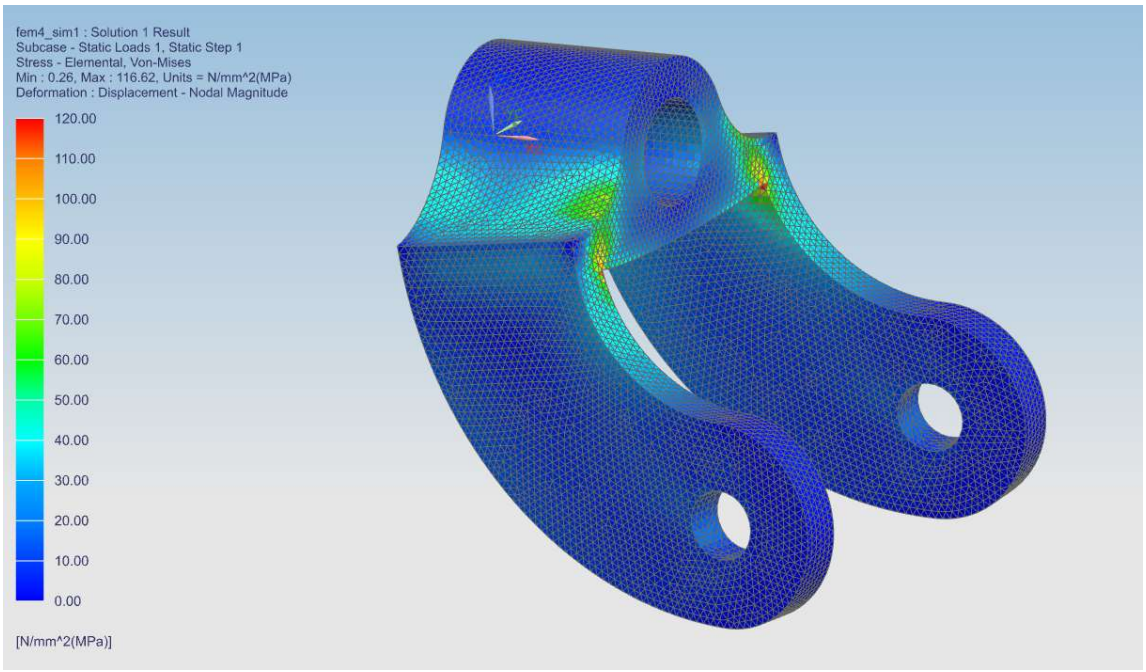
2. Will the part fail to ultimate stress?
   Yes the component will not fail at ultimate stress of 36000 psi as the max stress of all the cases is 4304 psi (lbf/in^2)
3. Which of the three cases provides the most accurate results?
   Case-c) Tetra(10), .08 in gives accurate results

Element size = 1.5 mm Tetra (4)

a) Maximum Displacement = 0.0714 mm



b) Maximum stress (Von-Mises Stress) = 113.868 MPa

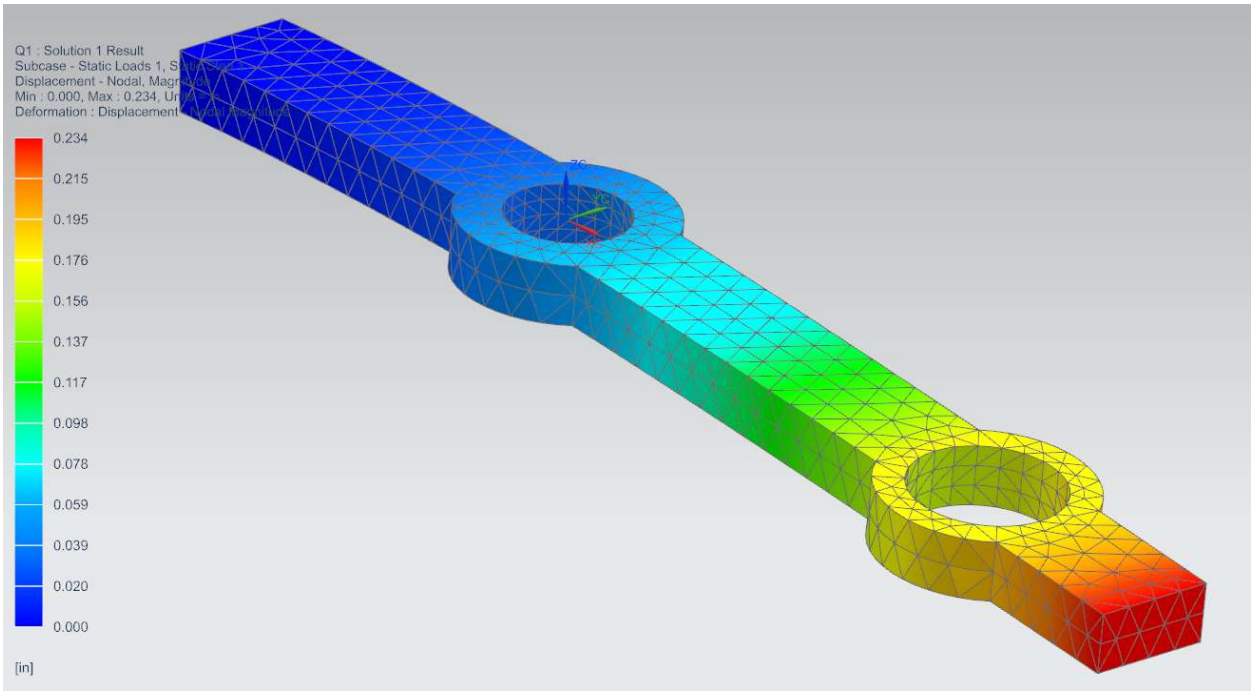


FEA OF CANTILEVER BEAM

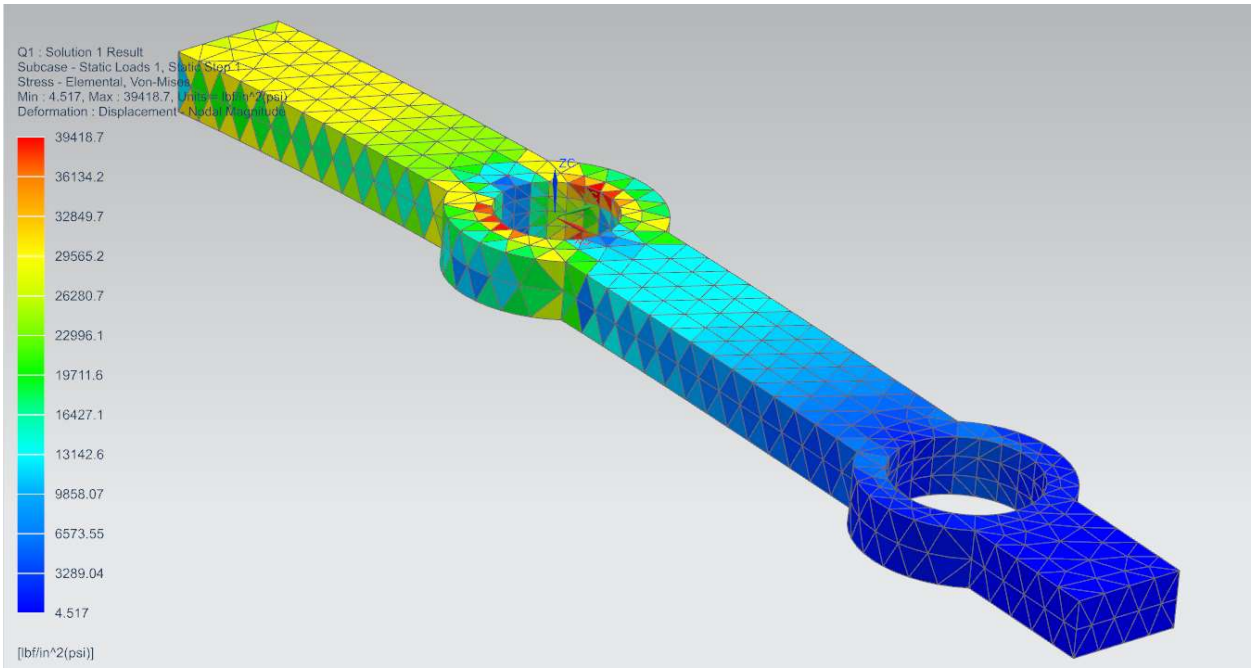
Element size = 0.25 in

Displacement – Nodal

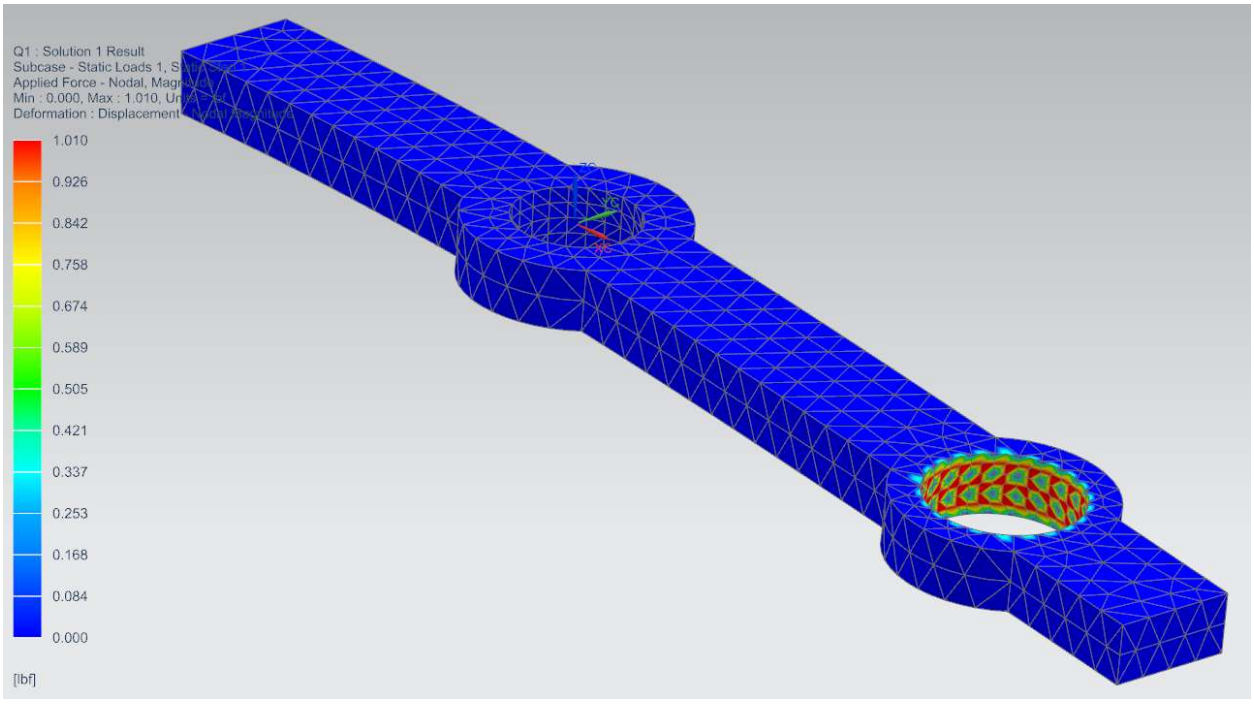
The analysis showed maximum deformation experienced at the tip is approximately 0.234 in



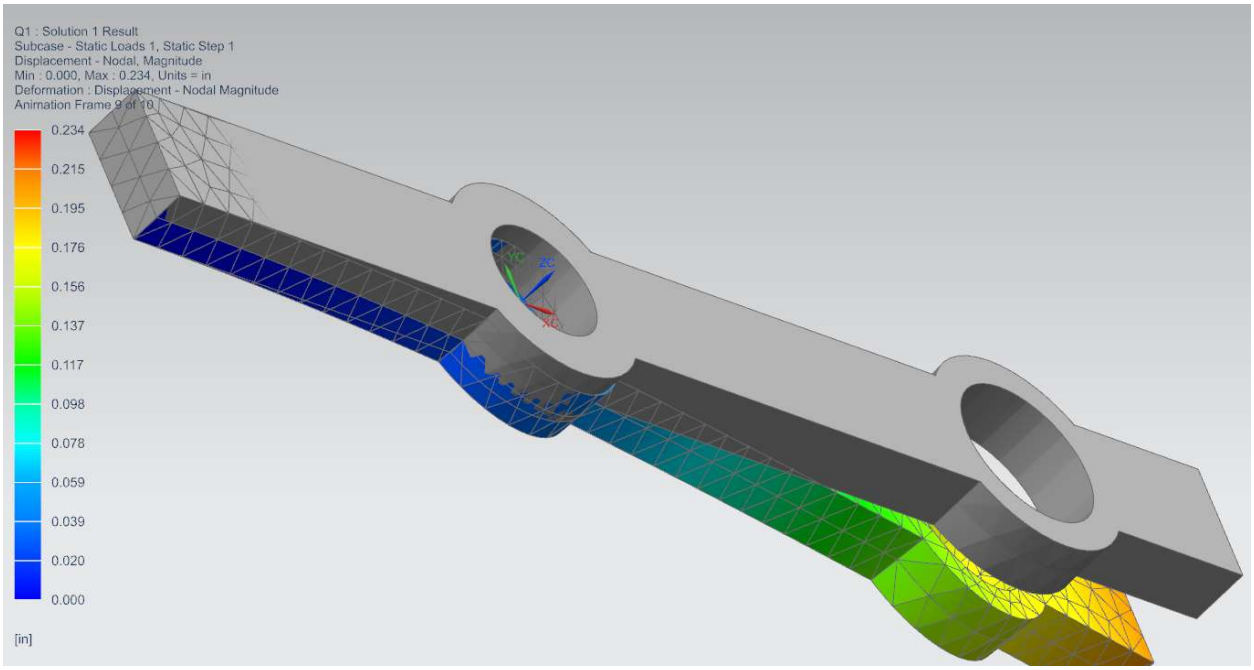
Von-mises Stress plot



Applied Nodal Force = 1.010 lbf



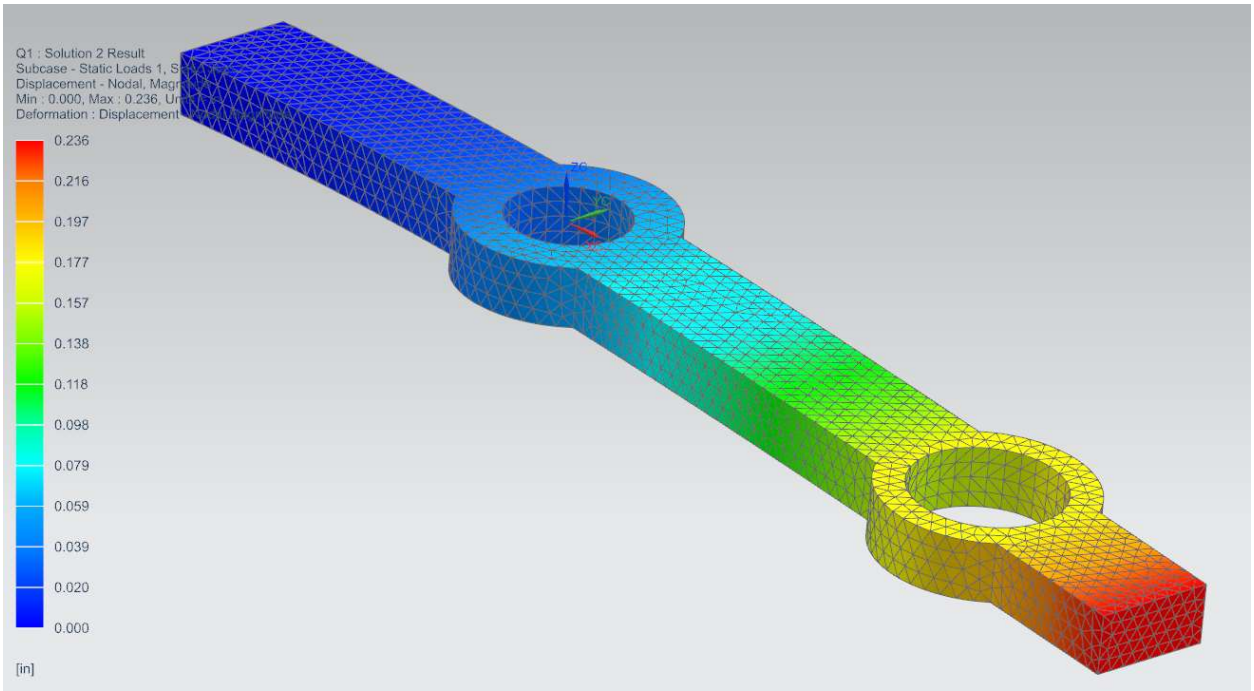
Animated view with shown undeformed mode on



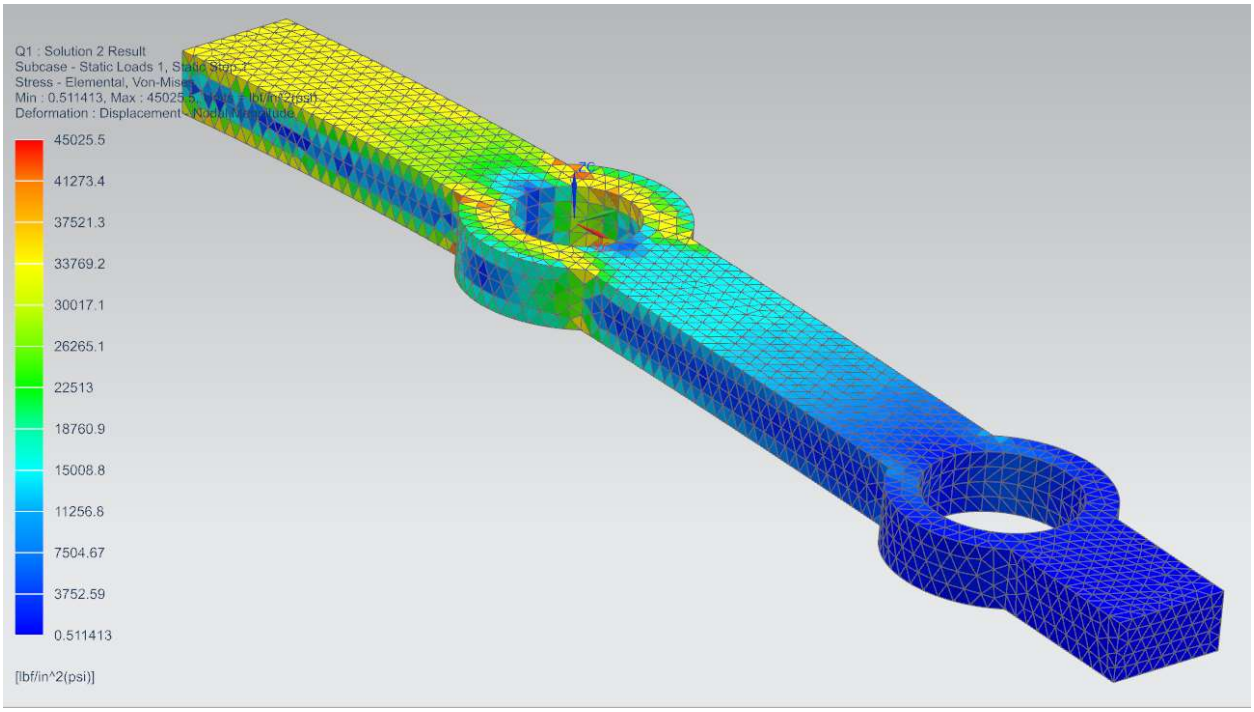
Element size = 0.125

Displacement – Nodal

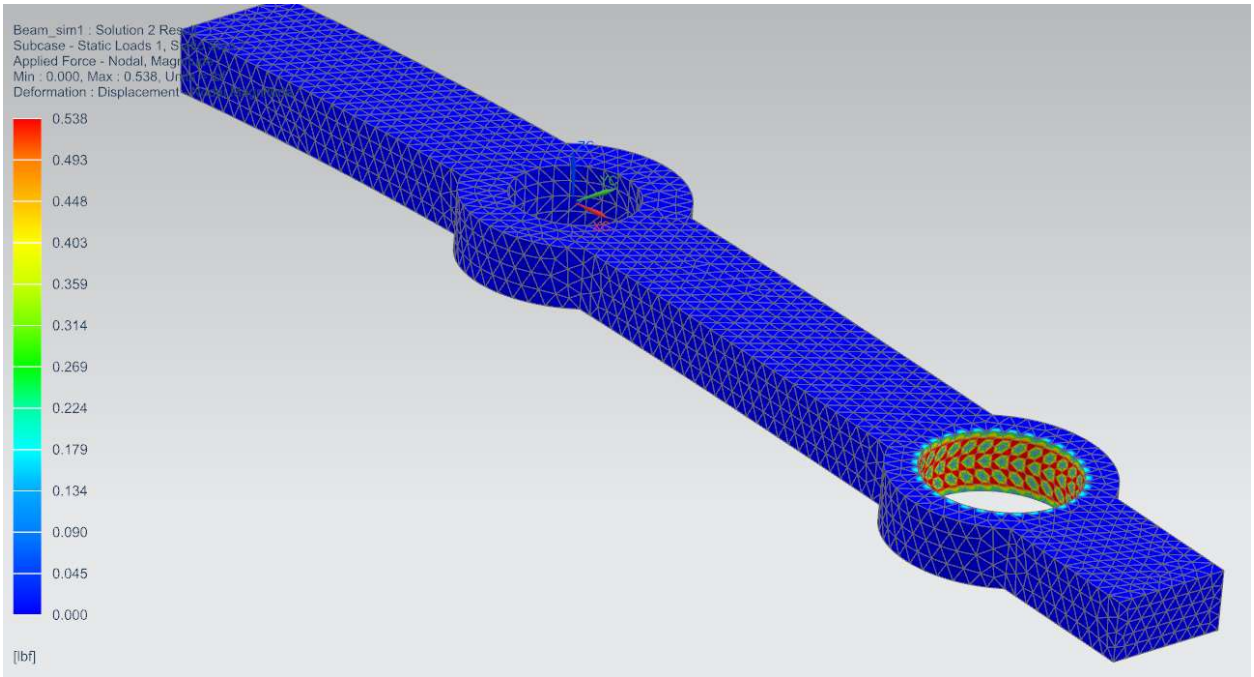
The analysis showed maximum deformation experienced at the tip is approximately 0.236 in



Von-mises Stress plot



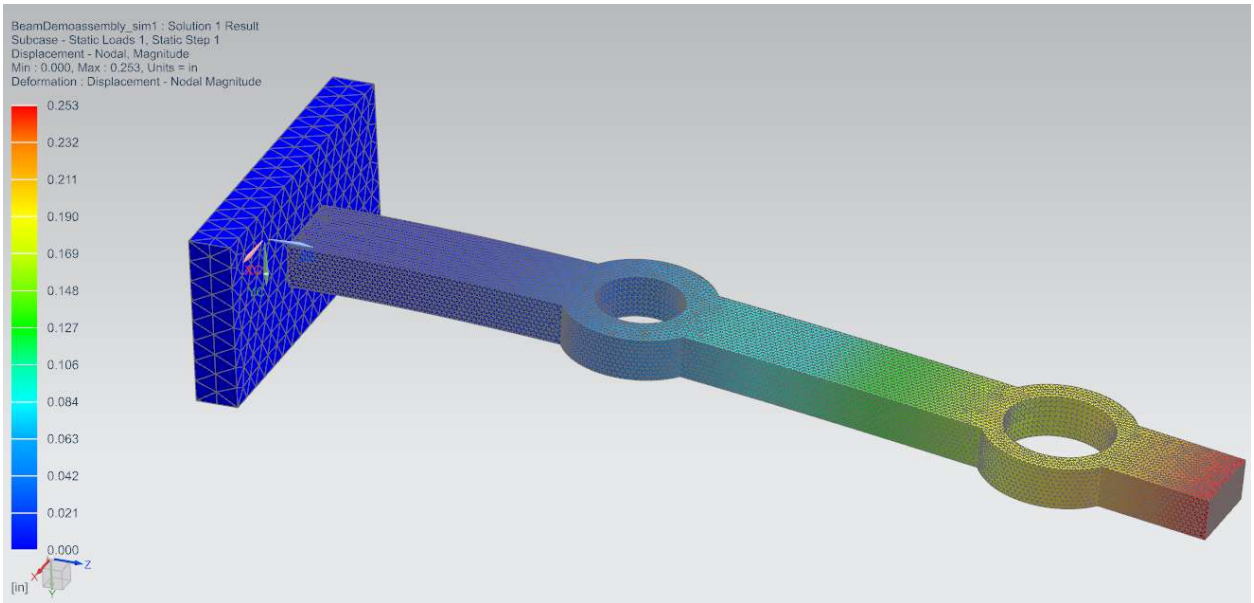
Applied Force = .538 lbf



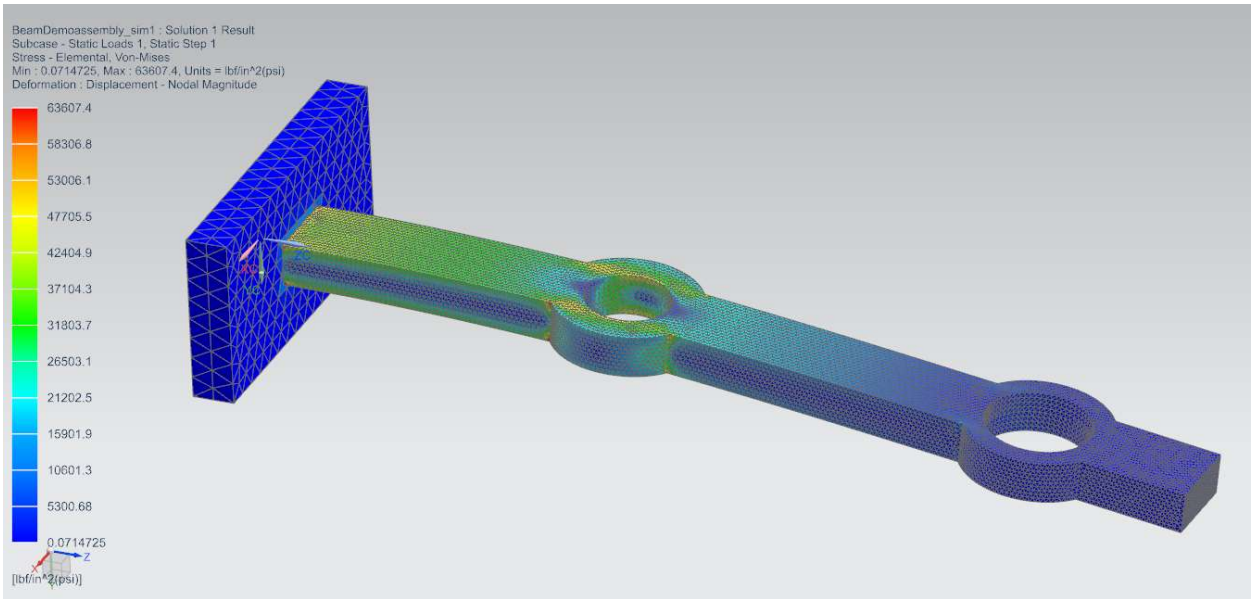
Cantilever Beam Attached to a wall:

Displacement – Nodal

The analysis showed maximum deformation experienced at the tip is approximately 0.253 in



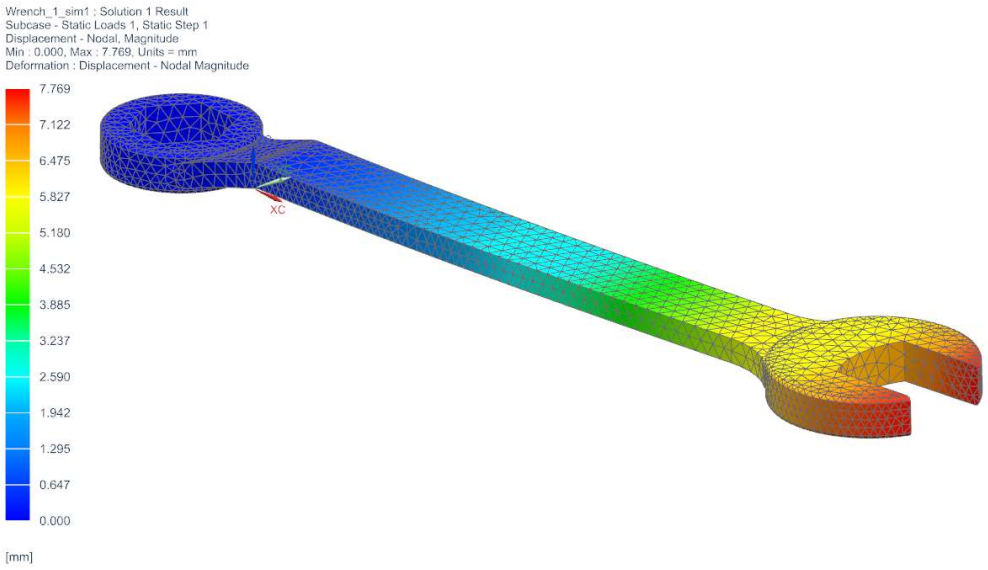
Von-mises Stress plot



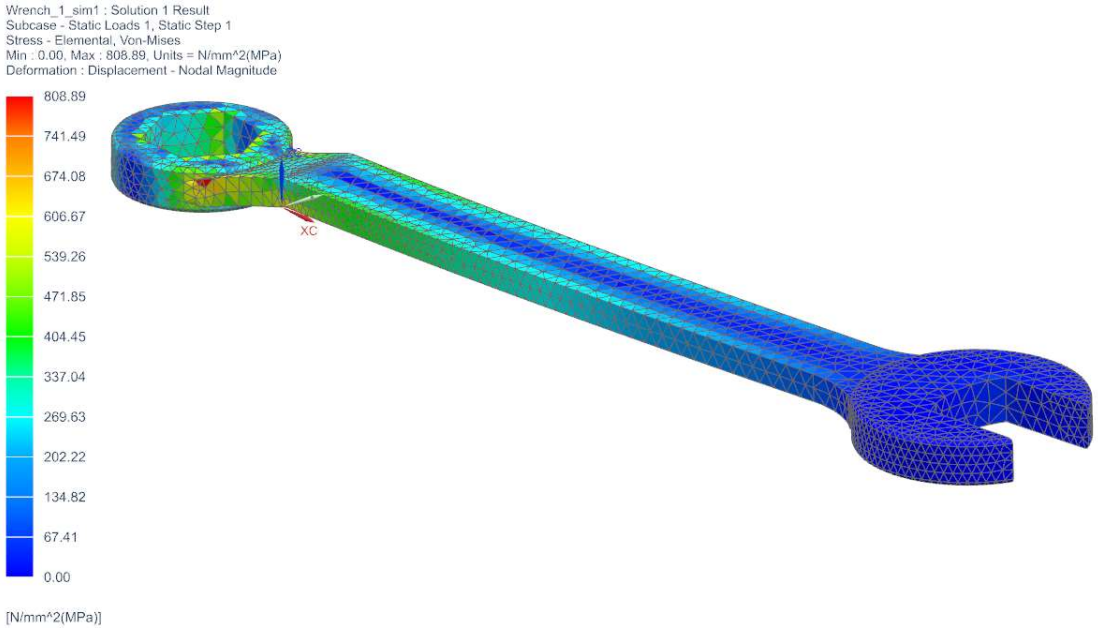
Linear Static Analysis of Wrench

Element size = 4 mm Tetra (10)

Maximum Displacement = 7.769 mm

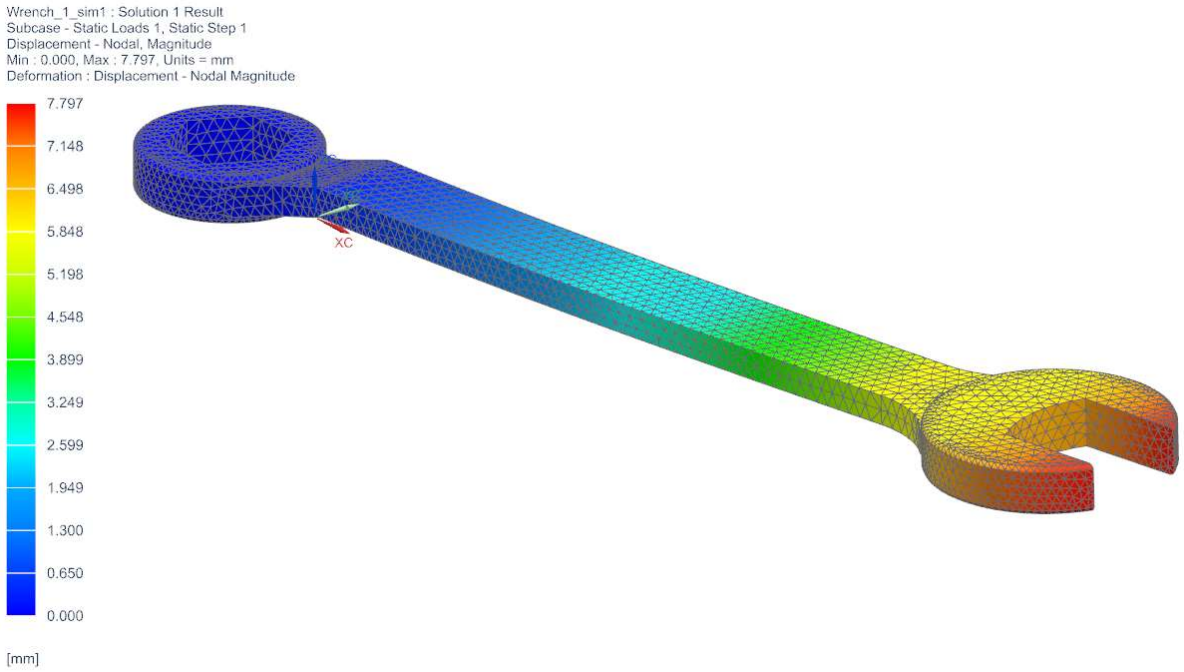


Von-Mises Stress = 717.601 MPa (max)

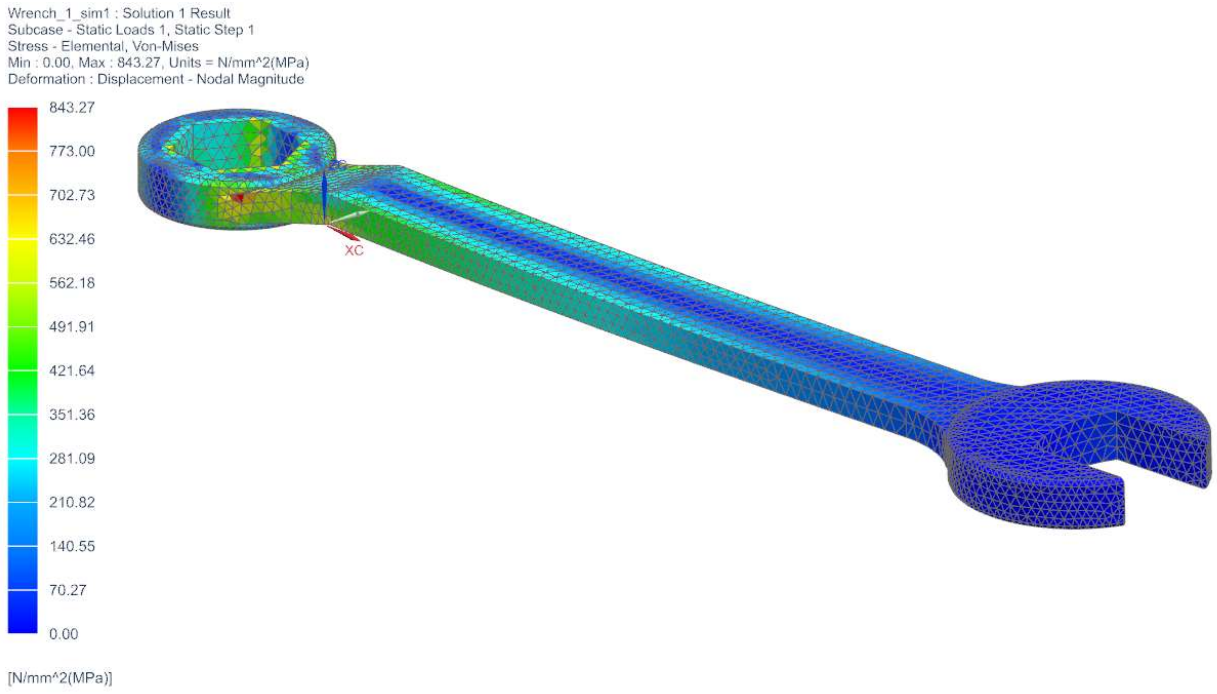


Element size = 3 mm Tetra (10)

Maximum Displacement = 7.797 mm

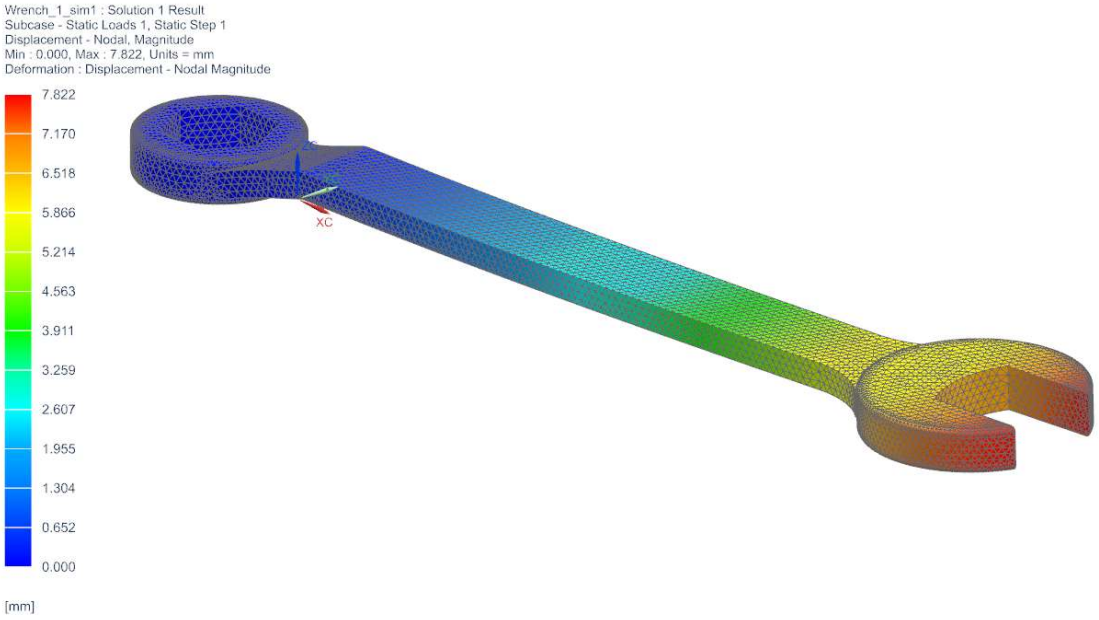


Von-Mises Stress = 737.443 MPa (max)

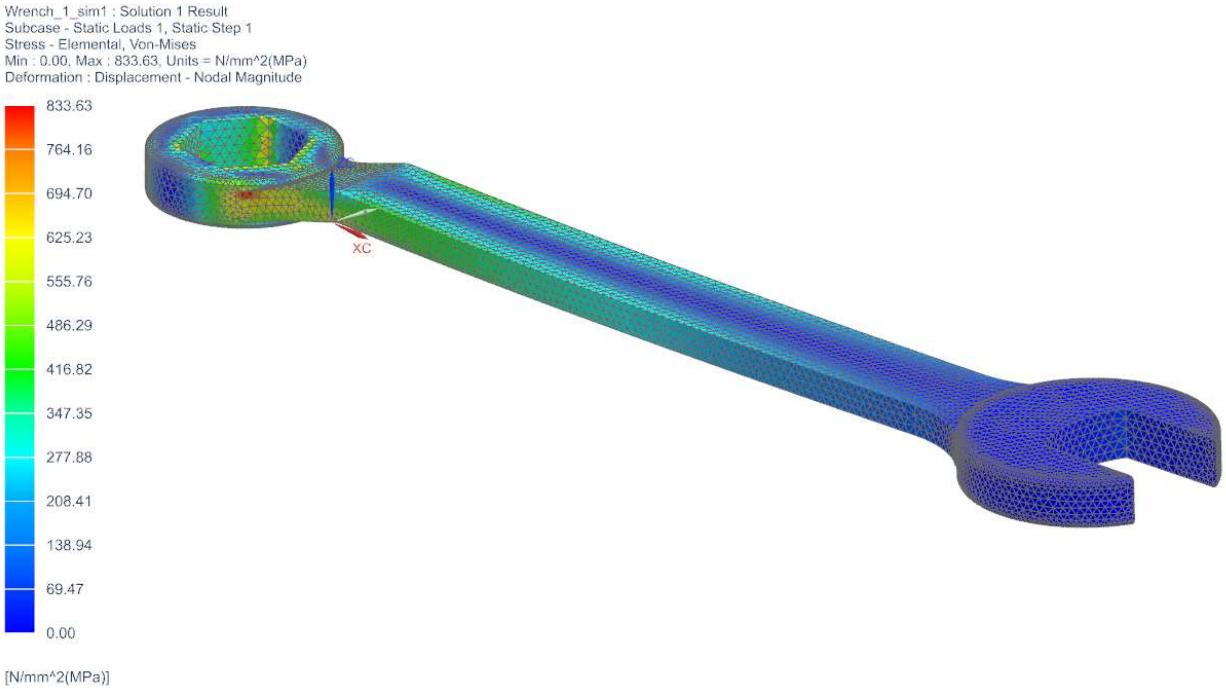


Element size = 2 mm Tetra (10)

Maximum Displacement = 7.822 mm

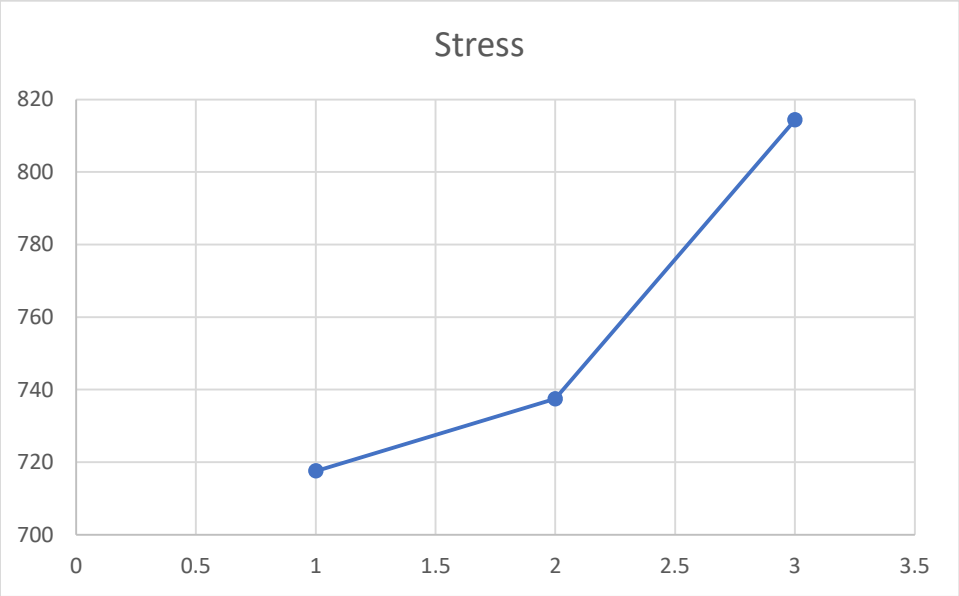


Von-Mises Stress = 814.428 MPa (max)



Convergence:

Wrench		
	Sr. No	Stress
3=4in	1	717.601
2=3in	2	737.443
1=2in	3	814.428



Answer the following questions:

1. What are the maximum deflection and the maximum stress for each of the four cases?

Sr No	Element Size	Max deflection (mm)	Max Stress (Mpa)
1	Tetra(10), 4 mm	7.769	**717.601**
2	Tetra(10), 3 mm	7.797	**737.443**
3	Tetra(10), 2 mm	7.822	**814.428**

2. Will the part fail to ultimate stress?

   No, it will fail at ultimate stress of 120 MPa as Max Stress value is above 700 MPa for all cases

3. Which of the three cases provides the most accurate results?
   Case-3) Tetra(10), 2 mm gives accurate results.