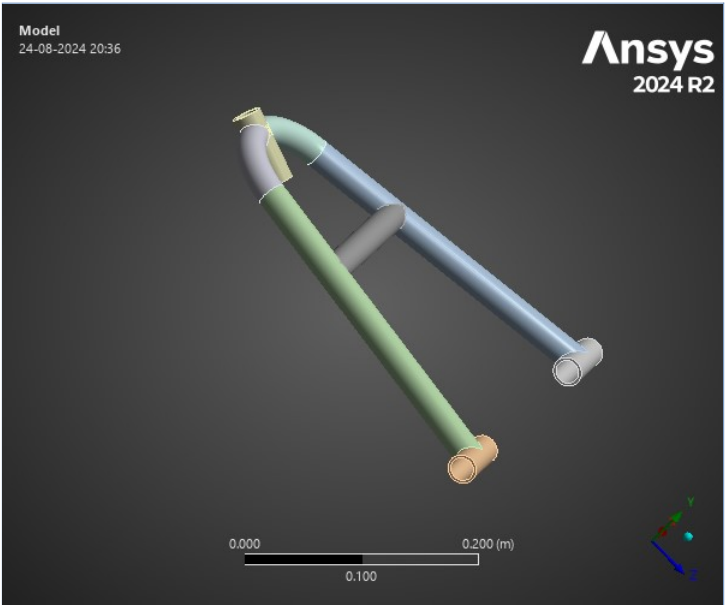




Project\*

First Saved	Saturday, August 24, 2024
Last Saved	Saturday, August 24, 2024
Product Version	2024 R2
Save Project Before Solution	No
Save Project After Solution	No



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Units

TABLE 1	
Unit System	Metric (m, kg, N, s, V, A) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (A4)

TABLE 2	
Model (A4) > Geometry Imports	
Object Name	Geometry Imports
State	Solved

TABLE 3	
Model (A4) > Geometry Imports > Geometry Import (A3)	
Object Name	Geometry Import (A3)
State	Solved
Definition	
Source	C:\Users\Hrishi\Downloads\Front Lower A Arm\Front Lower A Arm.SLDPRT
Type	SOLIDWORKS
Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	None
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

Geometry

TABLE 4	
Model (A4) > Geometry	
Object Name	Geometry
State	Fully Defined
Definition	
Source	C:\Users\Hrishi\Downloads\Front Lower A Arm\Front Lower A Arm.SLDPRT
Type	SOLIDWORKS
Length Unit	Meters

Element Control	Program Controlled
Display Style	Body Color
<b>Bounding Box</b>	
Length X	0.36 m
Length Y	4.6146e-002 m
Length Z	0.36584 m
<b>Properties</b>	
Volume	1.9447e-004 m <sup>3</sup>
Mass	1.5266 kg
Scale Factor Value	1.
<b>Statistics</b>	
Bodies	10
Active Bodies	10
Nodes	35299
Elements	17260
Mesh Metric	None
<b>Update Options</b>	
Assign Default Material	No
<b>Basic Geometry Options</b>	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
<b>Advanced Geometry Options</b>	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	None
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

**TABLE 5**  
**Model (A4) > Geometry > Body Groups**

Object Name	Front Lower A Arm
State	Meshed
<b>Graphics Properties</b>	
Visible	Yes
<b>Definition</b>	
Suppressed	No
Assignment	Moksha
Coordinate System	Default Coordinate System
<b>Bounding Box</b>	
Length X	0.36 m
Length Y	4.6146e-002 m
Length Z	0.36584 m
<b>Properties</b>	
Volume	1.9447e-004 m <sup>3</sup>
Mass	1.5266 kg
Centroid X	0.29985 m
Centroid Y	-3.0095e-004 m
Centroid Z	-0.17365 m
Moment of Inertia Ip1	1.7543e-002 kg·m <sup>2</sup>
Moment of Inertia Ip2	3.1776e-002 kg·m <sup>2</sup>
Moment of Inertia Ip3	1.4445e-002 kg·m <sup>2</sup>
<b>Statistics</b>	
Nodes	35299
Elements	17260
Mesh Metric	None

**TABLE 6**  
**Model (A4) > Geometry > Front Lower A Arm > Parts**

Object Name	Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[8]	Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[5]	Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[1]	Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNES (1)[7]
State	Meshed			
	Graphics Properties			
Visible	Yes			
Transparency	1			
	Definition			
Suppressed	No			
Stiffness Behavior	Flexible			
Coordinate System	Default Coordinate System			
Reference Temperature	By Environment			
Treatment	None			
	Material			

Assignment				Moksha
Nonlinear Effects	Yes			
Thermal Strain Effects	Yes			
Bounding Box				
Length X	6.e-002 m	0.10759 m		6.e-002 m
Length Y	2.54e-002 m			
Length Z	2.54e-002 m	0.28753 m		2.54e-002 m
Properties				
Volume	1.0791e-005 m³	5.1586e-005 m³	5.1585e-005 m³	1.0791e-005 m³
Mass	8.4712e-002 kg	0.40495 kg	0.40494 kg	8.4712e-002 kg
Centroid X	0.44985 m	0.40551 m	0.1942 m	0.14985 m
Centroid Y	3.8158e-018 m	6.5074e-006 m	-6.5111e-006 m	3.6958e-019 m
Centroid Z	1.5392e-006 m	-0.14653 m		1.5392e-006 m
Moment of Inertia Ip1	1.1176e-005 kg·m²	2.7795e-003 kg·m²		1.1176e-005 kg·m²
Moment of Inertia Ip2	3.0953e-005 kg·m²	2.7793e-003 kg·m²		3.0953e-005 kg·m²
Moment of Inertia Ip3	3.0955e-005 kg·m²	5.2787e-005 kg·m²		3.0955e-005 kg·m²
Statistics				
Nodes	2029	9550	9595	2039
Elements	976	4730	4750	980
Mesh Metric	None			

TABLE 7  
Model (A4) > Materials

Object Name	Materials
State	Fully Defined
Statistics	
Materials	2
Material Assignments	0

Coordinate Systems

TABLE 8  
Model (A4) > Coordinate Systems > Coordinate System

Object Name	Global Coordinate System
State	Fully Defined
Definition	
Type	Cartesian
Coordinate System ID	0.
Origin	
Origin X	0. m
Origin Y	0. m
Origin Z	0. m
Directional Vectors	
X Axis Data	[ 1. 0. 0. ]
Y Axis Data	[ 0. 1. 0. ]
Z Axis Data	[ 0. 0. 1. ]
Transfer Properties	
Source	
Read Only	No

Connections

TABLE 9  
Model (A4) > Connections

Object Name	Connections
State	Fully Defined
Auto Detection	
Generate Automatic Connection On Refresh	Yes
Transparency	
Enabled	Yes
Statistics	
Contacts	12
Active Contacts	12
Joints	0
Active Joints	0
Beams	0
Active Beams	0
Bearings	0
Active Bearings	0
Springs	0
Active Springs	0
Body Interactions	0
Active Body Interactions	0

**TABLE 10**  
**Model (A4) > Connections > Contacts**

Object Name	Contacts
State	Fully Defined
<b>Definition</b>	
Connection Type	Contact
<b>Scope</b>	
Scoping Method	Geometry Selection
Geometry	All Bodies
<b>Auto Detection</b>	
Tolerance Type	Slider
Tolerance Slider	0.
Tolerance Value	1.2883e-003 m
Use Range	No
Face/Face	Yes
Face-Face Angle Tolerance	75. °
Face Overlap Tolerance	Off
Cylindrical Faces	Include
Face/Edge	No
Edge/Edge	No
Priority	Include All
Group By	Bodies
Search Across	Bodies
<b>Statistics</b>	
Connections	12
Active Connections	12

**TABLE 11**  
**Model (A4) > Connections > Contacts > Contact Regions**

Object Name	Contact Region	Contact Region 2	Contact Region 3	Contact Region 4	Contact Region 5	Contact Region 6
State	Fully Defined					
Scope						
Scoping Method	Geometry Selection					
Contact	1 Face					
Target	1 Face					
Contact Bodies	AI round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[8]	AI round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS(1)[5]		AI round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS(1)		
Target Bodies	AI round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[5]	Cut-Extrude3 (1)	AI round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[6]	AI round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[7]	Cut-Extrude3 (2)	AI round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS (1)[6]
Protected	No					
Definition						
Type	Bonded					
Scope Mode	Automatic					
Behavior	Program Controlled					
Trim Contact	Program Controlled					
Trim Tolerance	1.2883e-003 m					
Contact APDL Name						
Target APDL Name						
Suppressed	No					
Display						
Element Normals	No					
Advanced						
Formulation	Program Controlled					
Small Sliding	Program Controlled					
Detection Method	Program Controlled					
Penetration Tolerance	Program Controlled					
Elastic Slip Tolerance	Program Controlled					
Normal Stiffness	Program Controlled					
Update Stiffness	Program Controlled					
Pinball Region	Program Controlled					
Geometric Modification						
Contact Geometry Correction	None					
Target Geometry Correction	None					

**TABLE 12**  
**Model (A4) > Connections > Contacts > Contact Regions**

Object Name	Contact Region 12
State	Fully Defined

Scope	
Scoping Method	Geometry Selection
Contact	1 Face
Target	1 Face
Contact Bodies	Cut-Extrude3[2]
Target Bodies	Cut-Extrude1[4]
Protected	No
Definition	
Type	Bonded
Scope Mode	Automatic
Behavior	Program Controlled
Trim Contact	Program Controlled
Trim Tolerance	1.2883e-003 m
Contact APDL Name	
Target APDL Name	
Suppressed	No
Display	
Element Normals	No
Advanced	
Formulation	Program Controlled
Small Sliding	Program Controlled
Detection Method	Program Controlled
Penetration Tolerance	Program Controlled
Elastic Slip Tolerance	Program Controlled
Normal Stiffness	Program Controlled
Update Stiffness	Program Controlled
Pinball Region	Program Controlled
Geometric Modification	
Contact Geometry Correction	None
Target Geometry Correction	None

### Mesh

**TABLE 13**  
**Model (A4) > Mesh**

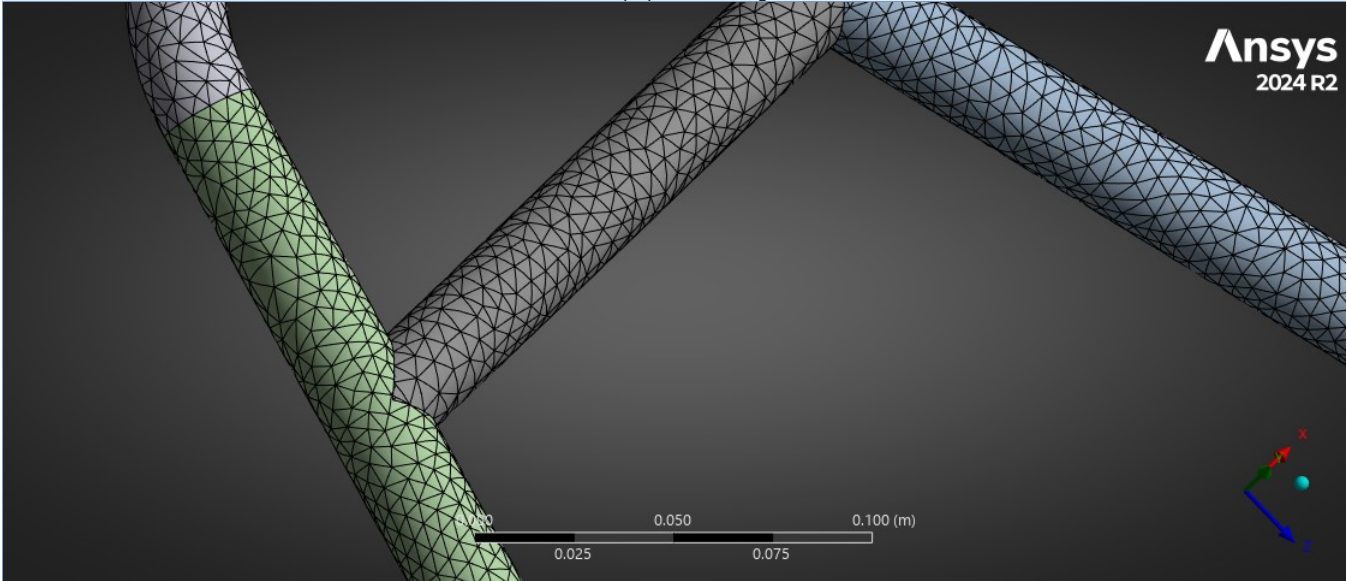
Object Name	Mesh
State	Solved
Display	
Display Style	Use Geometry Setting
Defaults	
Physics Preference	Mechanical
Element Order	Program Controlled
Element Size	5.e-003 m
Sizing	
Use Adaptive Sizing	Yes
Resolution	Default (2)
Mesh Defeaturing	Yes
Defeature Size	Default
Transition	Fast
Span Angle Center	Coarse
Initial Size Seed	Assembly
Bounding Box Diagonal	0.51533 m
Average Surface Area	3.282e-003 m²
Minimum Edge Length	3.5562e-003 m
Quality	
Check Mesh Quality	Yes, Errors
Error Limits	Aggressive Mechanical
Target Element Quality	Default (5.e-002)
Smoothing	Medium
Mesh Metric	None
Inflation	
Use Automatic Inflation	None
Inflation Option	Smooth Transition
Transition Ratio	0.272
Maximum Layers	5
Growth Rate	1.2
Inflation Algorithm	Pre
Inflation Element Type	Wedges
View Advanced Options	No
Advanced	
Number of CPUs for Parallel Part Meshing	Program Controlled
Straight Sided Elements	No
Rigid Body Behavior	Dimensionally Reduced
Triangle Surface Mesher	Program Controlled
Topology Checking	Yes
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	35299
Elements	17260
Show Detailed Statistics	No

**TABLE 14**  
**Model (A4) > Mesh > Mesh Controls**

Object Name	Patch Conforming Method
State	Fully Defined
Scope	
Scoping Method	Geometry Selection

Geometry	10 Bodies
Definition	
Suppressed	No
Method	Tetrahedrons
Algorithm	Patch Conforming
Element Order	Use Global Setting
Advanced Improve Options	
Aggressive Thin Face Collapse	Program Controlled
Automatic Node Movement	Program Controlled
Refinement Options	
Refine at Thin Section	No

FIGURE 1  
Model (A4) > Mesh > Image



Static Structural (A5)

TABLE 15  
Model (A4) > Analysis

Object Name	Static Structural (A5)
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 16  
Model (A4) > Static Structural (A5) > Analysis Settings

Object Name	Analysis Settings
State	Fully Defined
Step Controls	
Number Of Steps	1.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
Solver Controls	
Solver Type	Program Controlled
Weak Springs	Off
Solver Pivot Checking	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Quasi-Static Solution	Off
Rotordynamics Controls	
Coriolis Effect	Off
Restart Controls	
Generate Restart Points	Program Controlled
Retain Files After Full Solve	No
Combine Restart Files	Program Controlled
Nonlinear Controls	
Newton-Raphson Option	Program Controlled
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Stabilization	Program Controlled

Advanced	
Inverse Option	No
Contact Split (DMP)	Program Controlled
Output Controls	
Output Selection	None
Stress	Yes
Back Stress	No
Strain	Yes
Contact Data	Yes
Nonlinear Data	No
Nodal Forces	No
Volume and Energy	Yes
Euler Angles	Yes
General Miscellaneous	No
Contact Miscellaneous	No
Store Results At	All Time Points
Result File Compression	Program Controlled
Analysis Data Management	
Solver Files Directory	C:\Users\Hrishi\AppData\Local\Temp\WB_Hrishi_28520_2\wbnew_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	mks

FIGURE 2  
Model (A4) > Static Structural (A5) > Image

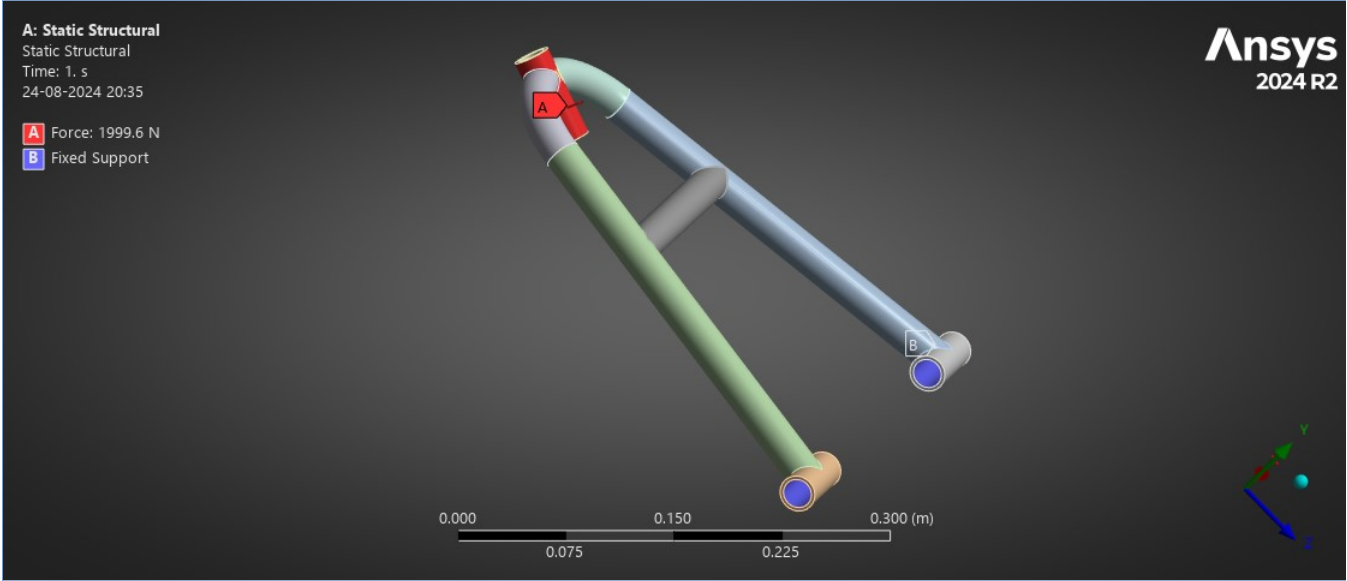
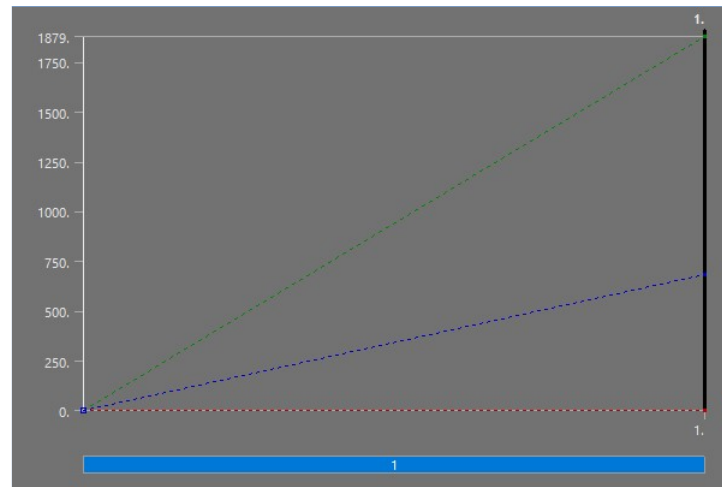


TABLE 17		
Model (A4) > Static Structural (A5) > Loads		
Object Name	Force	Fixed Support
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	1 Face	2 Faces
Definition		
Type	Force	Fixed Support
Define By	Components	
Applied By	Surface Effect	
Coordinate System	Global Coordinate System	
X Component	0. N (ramped)	
Y Component	1879. N (ramped)	
Z Component	684. N (ramped)	
Suppressed	No	

FIGURE 3  
Model (A4) > Static Structural (A5) > Force





Solution (A6)

**TABLE 18**  
Model (A4) > Static Structural (A5) > Solution

Object Name	Solution (A6)
State	Solved
<b>Adaptive Mesh Refinement</b>	
Max Refinement Loops	1.
Refinement Depth	2.
<b>Information</b>	
Status	Done
MAPDL Elapsed Time	5. s
MAPDL Memory Used	719. MB
MAPDL Result File Size	11.75 MB
<b>Post Processing</b>	
Beam Section Results	No
On Demand Stress/Strain	No

**TABLE 19**  
Model (A4) > Static Structural (A5) > Solution (A6) > Solution Information

Object Name	Solution Information
State	Solved
<b>Solution Information</b>	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0
Update Interval	2.5 s
Display Points	All
<b>FE Connection Visibility</b>	
Activate Visibility	Yes
Display	All FE Connectors
Draw Connections Attached To	All Nodes
Line Color	Connection Type
Visible on Results	No
Line Thickness	Single
Display Type	Lines

**TABLE 20**  
Model (A4) > Static Structural (A5) > Solution (A6) > Results

Object Name	Total Deformation	Equivalent Stress
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Total Deformation	Equivalent (von-Mises) Stress
By	Time	
Display Time	Last	
Separate Data by Entity	No	
Calculate Time History	Yes	
Identifier		
Suppressed	No	
Results		
Minimum	0. m	147.28 Pa
Maximum	4.978e-003 m	2.9792e+008 Pa
Average	1.8398e-003 m	6.51e+007 Pa
Minimum Occurs On	Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS(1)[8]	Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS(1)[7]
Maximum Occurs On	Al round tubing 25.4MM_OD_3MM_WALL_THICKNESS(1)	Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS(1)[5]
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	
Integration Point Results		



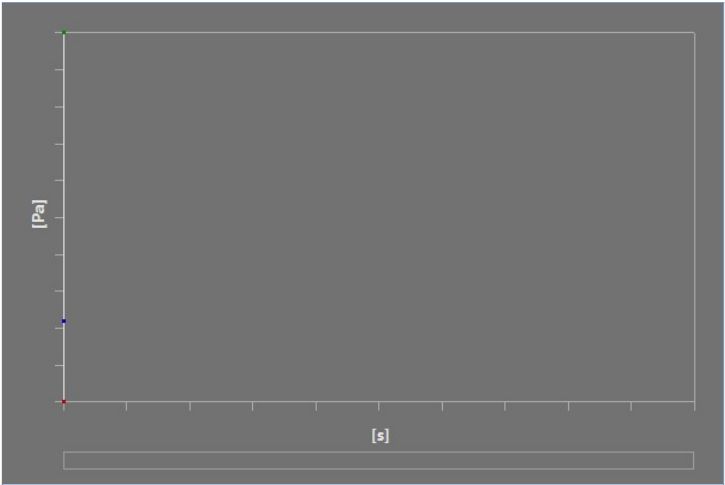


TABLE 22  
Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress

Time [s]	Minimum [Pa]	Maximum [Pa]	Average [Pa]
1.	147.28	2.9792e+008	6.51e+007

FIGURE 7  
Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress > Image

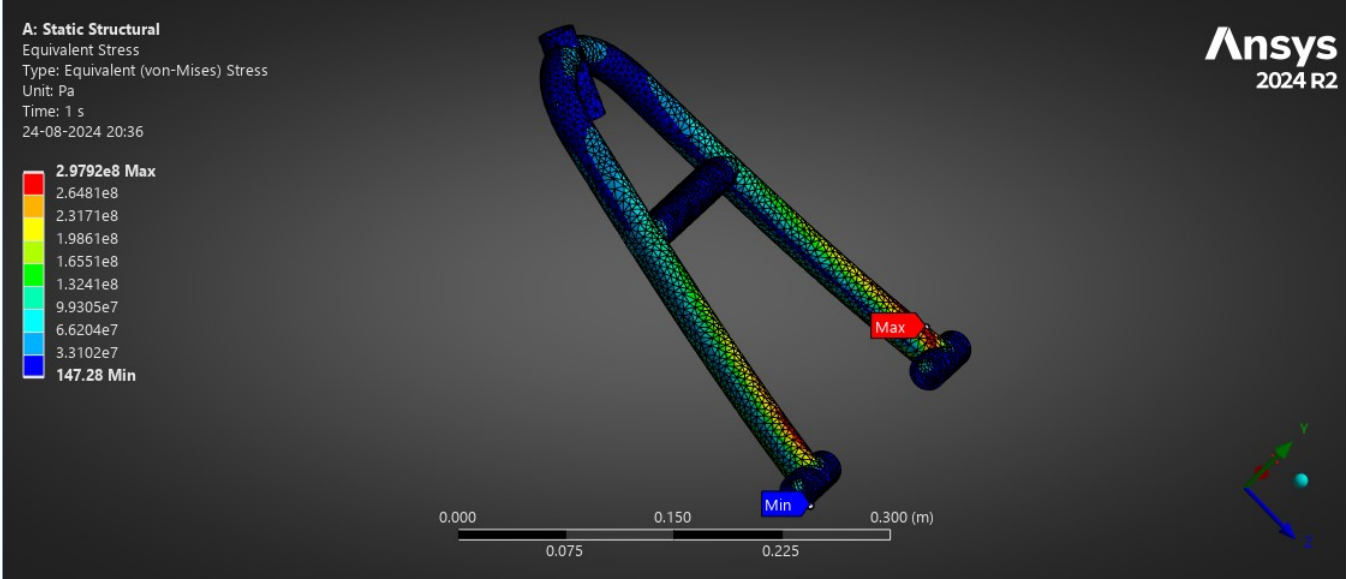


TABLE 23  
Model (A4) > Static Structural (A5) > Solution (A6) > Stress Safety Tools

Object Name	Stress Tool
State	Solved
Definition	
Theory	Max Equivalent Stress
Stress Limit Type	Tensile Yield Per Material

TABLE 24  
Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Results

Object Name	Safety Factor
State	Solved
Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Definition	
Type	Safety Factor
By	Time
Display Time	Last
Separate Data by Entity	No
Calculate Time History	Yes
Identifier	
Suppressed	No
Integration Point Results	
Display Option	Averaged
Average Across Bodies	No
Results	
Minimum	1.5441

Minimum Occurs On   Al round tubing 25.4MM_OD_2.5MM_WALL_THICKNESS(1)[5]	
Information	
Time	1. s
Load Step	1
Substep	1
Iteration Number	1

FIGURE 8  
Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor

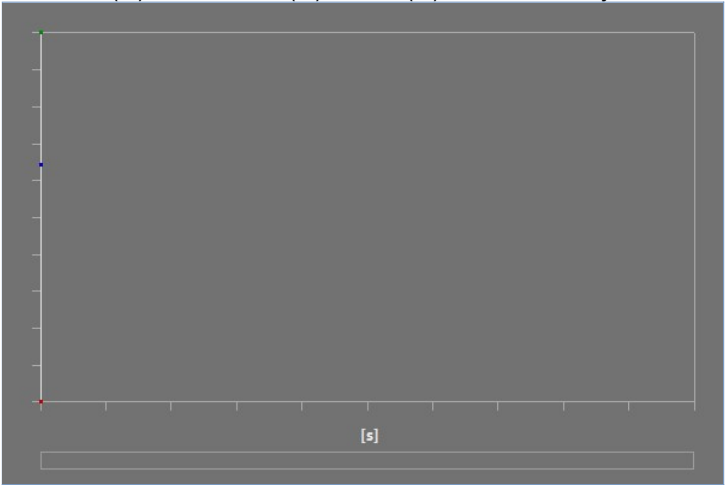
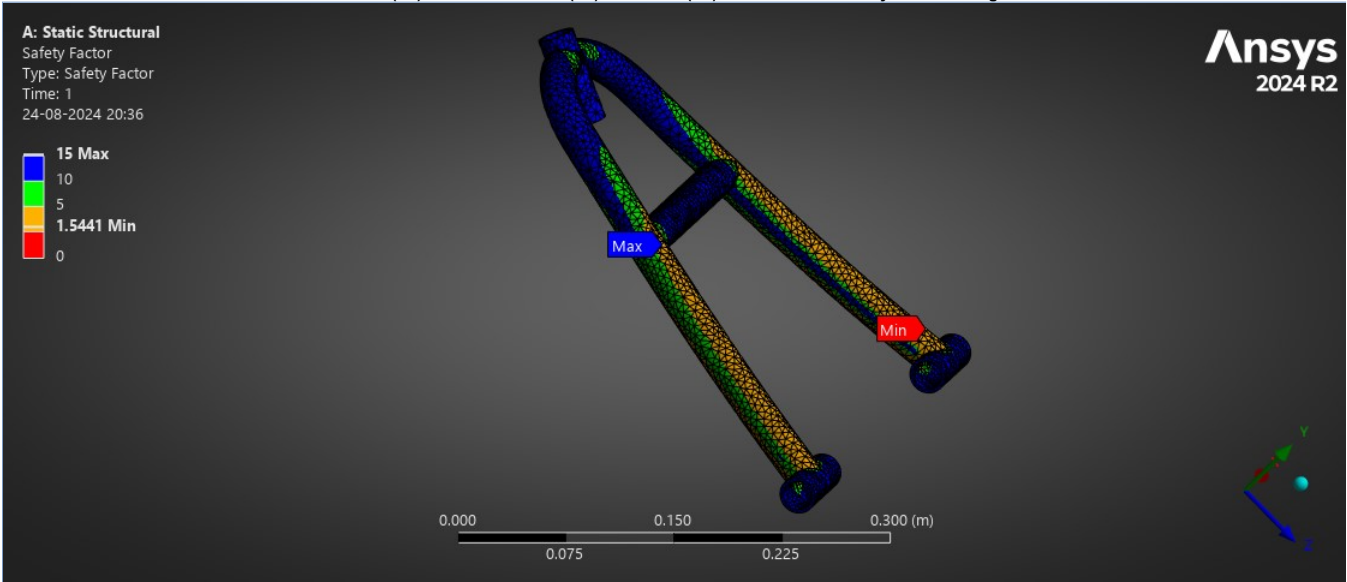


TABLE 25  
Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor

Time [s]	Minimum	Maximum	Average
1.	1.5441	15.	10.173

FIGURE 9  
Model (A4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor > Image



Material Data

Moksha

TABLE 26  
Moksha > Constants  
Density | 7850 kg m^-3

TABLE 27  
Moksha > Color  
Red | Green | Blue  
109 | 157 | 209

TABLE 28  
Moksha > Isotropic Elasticity

Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa	Temperature C
2.016e+011	0.26	1.4e+011	8.e+010	

**TABLE 29**  
**Moksha > Tensile Yield Strength**

Tensile Yield Strength Pa
4.6e+008

**TABLE 30**  
**Moksha > Tensile Ultimate Strength**

Tensile Ultimate Strength Pa
5.6e+008