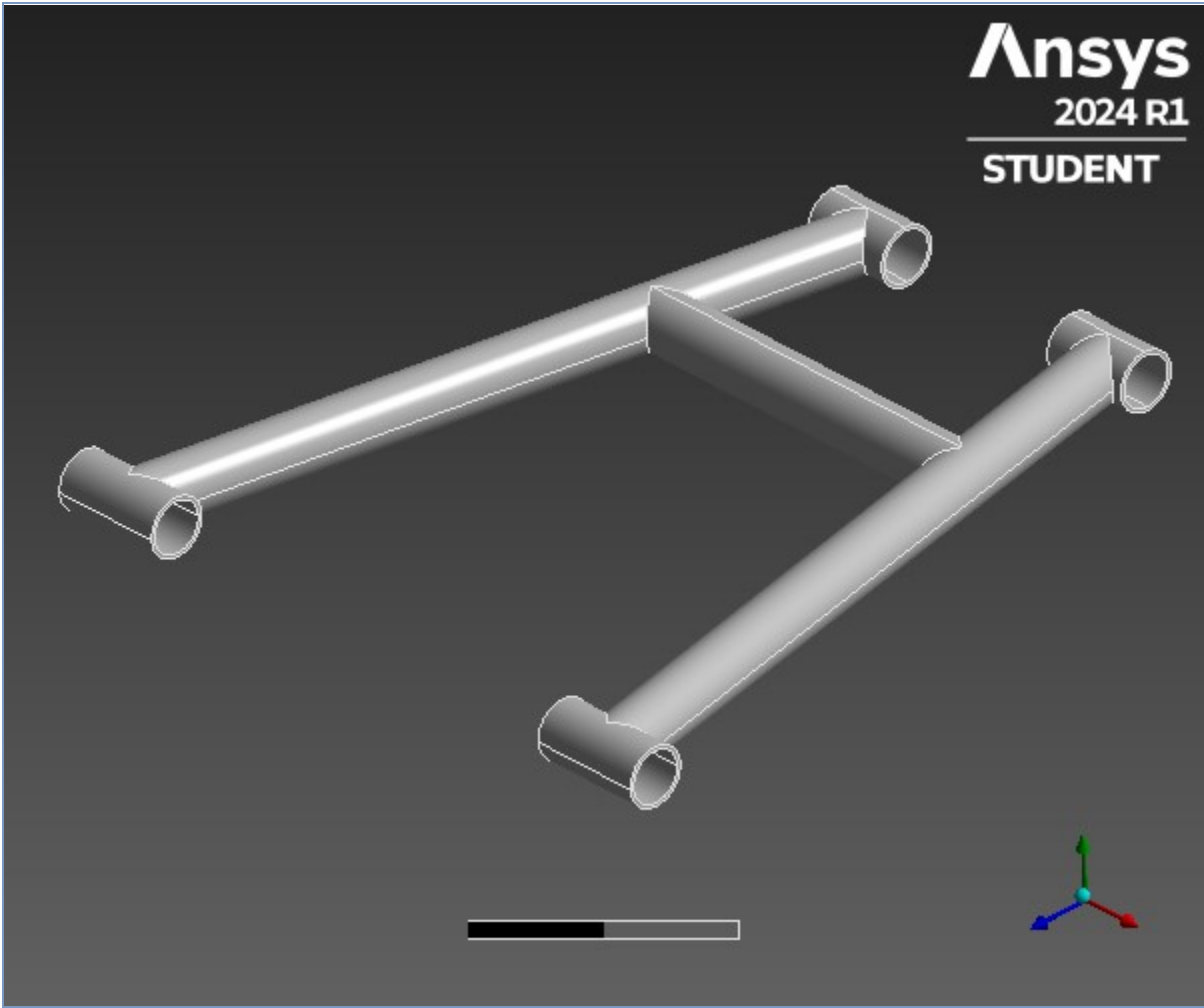




Project*

First Saved	Wednesday, July 3, 2024
Last Saved	Wednesday, July 3, 2024
Product Version	2024 R1
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, B4, C4)

TABLE 2
Model (A4, B4, C4) > Geometry Imports

Object Name	<i>Geometry Imports</i>
State	Solved

TABLE 3
Model (A4, B4, C4) > Geometry Imports > Geometry Import (A3, B3, C3)

Object Name	<i>Geometry Import (A3, B3, C3)</i>
State	Solved
Definition	
Source	C:\Users\91982\AppData\Local\Temp\WB_91982_26208_2\wbnew_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Basic Geometry Options	
Parameters	Independent
Parameter Key	
Advanced Geometry Options	
Compare Parts On Update	No
Analysis Type	3-D

Geometry

TABLE 4
Model (A4, B4, C4) > Geometry

Object Name	<i>Geometry</i>
State	Fully Defined
Definition	
Source	C:\Users\91982\AppData\Local\Temp\WB_91982_26208_2\wbnew_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Length Unit	Meters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	0.31 m
Length Y	2.54e-002 m
Length Z	0.33978 m
Properties	
Volume	1.1513e-004 m ³
Mass	0.90376 kg
Scale Factor Value	1.
Statistics	
Bodies	1
Active Bodies	1

Nodes	37501
Elements	18737
Mesh Metric	None
Update Options	
Assign Default Material	No
Basic Geometry Options	
Parameters	Independent
Parameter Key	
Attributes	Yes
Attribute Key	
Named Selections	Yes
Named Selection Key	
Material Properties	Yes
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	Yes
Coordinate System Key	
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
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, B4, C4) > Geometry > Parts

Object Name	<i>Solid</i>
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	Structural Steel
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	0.31 m
Length Y	2.54e-002 m
Length Z	0.33978 m
Properties	

Volume	1.1513e-004 m ³
Mass	0.90376 kg
Centroid X	0.2841 m
Centroid Y	-3.8533e-006 m
Centroid Z	-0.16417 m
Moment of Inertia Ip1	9.1652e-003 kg·m ²
Moment of Inertia Ip2	1.7089e-002 kg·m ²
Moment of Inertia Ip3	8.0516e-003 kg·m ²
Statistics	
Nodes	37501
Elements	18737
Mesh Metric	None

TABLE 6
Model (A4, B4, C4) > Materials

Object Name	<i>Materials</i>
State	Fully Defined
Statistics	
Materials	2
Material Assignments	0

Coordinate Systems

TABLE 7
Model (A4, B4, C4) > Coordinate Systems > Coordinate System

Object Name	<i>Global Coordinate System</i>
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

Mesh

TABLE 8
Model (A4, B4, C4) > Mesh

Object Name	<i>Mesh</i>
State	Solved
Display	
Display Style	Use Geometry Setting
Defaults	
Physics Preference	Mechanical

Element Order	Program Controlled
Element Size	Default
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	0.46065 m
Average Surface Area	2.9004e-003 m ²
Minimum Edge Length	9.4056e-003 m
Quality	
Check Mesh Quality	Mesh Quality Worksheet
Error Limits	Standard 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	37501
Elements	18737
Show Detailed Statistics	No

TABLE 9
Model (A4, B4, C4) > Mesh > Mesh Controls

Object Name	<i>Face Sizing</i>
State	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	48 Faces
Definition	
Suppressed	No
Type	Element Size
Element Size	5.e-003 m

Advanced	
Defeature Size	Default
Influence Volume	No
Behavior	Soft

Static Structural (A5)

TABLE 10
Model (A4, B4, C4) > Analysis

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

TABLE 11
Model (A4, B4, C4) > Static Structural (A5) > Analysis Settings

Object Name	<i>Analysis Settings</i>
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	
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\91982\AppData\Local\Temp\WB_91982_26208_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 1
Model (A4, B4, C4) > Static Structural (A5) > Figure

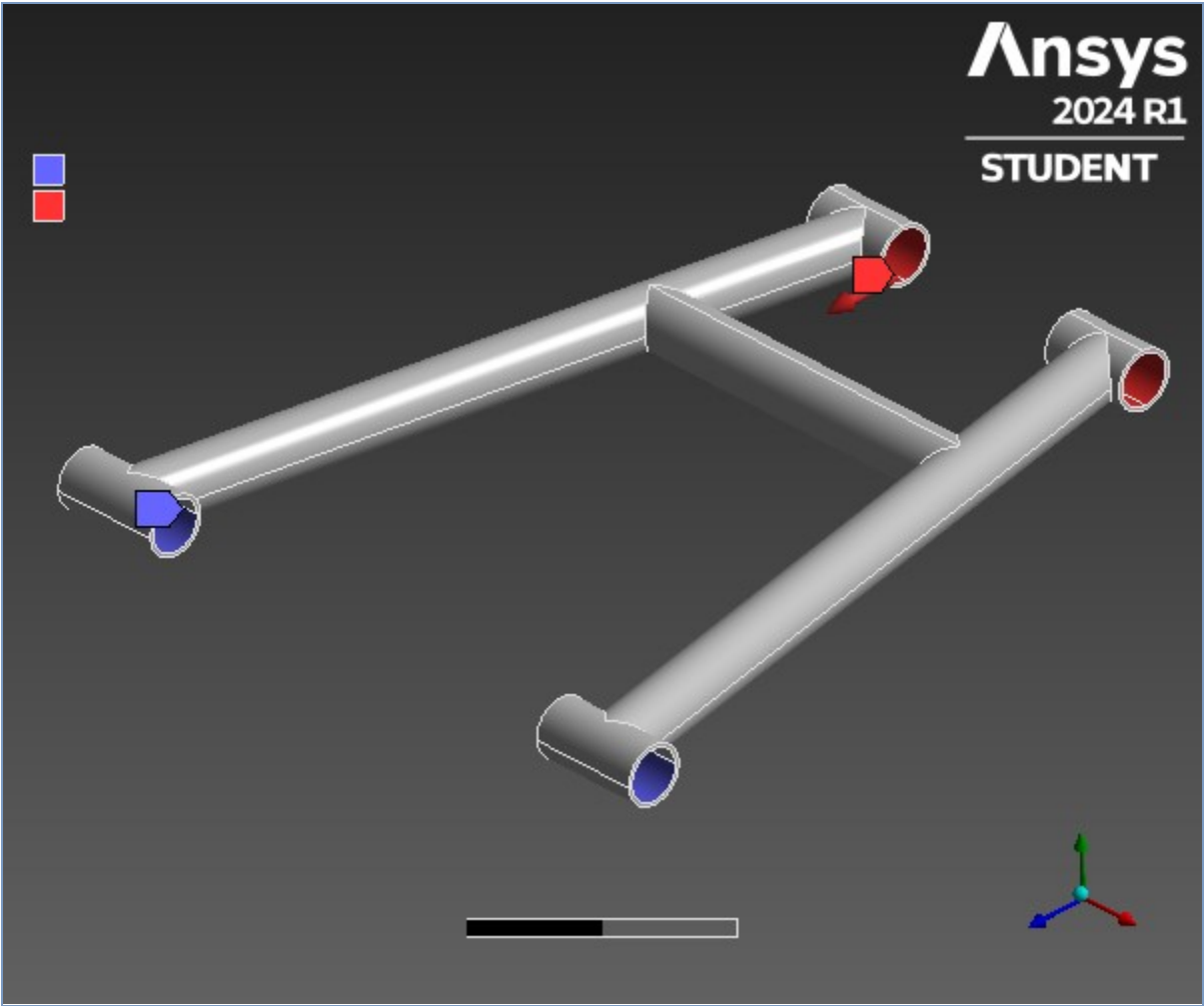


TABLE 12		
Model (A4, B4, C4) > Static Structural (A5) > Loads		
Object Name	Fixed Support	Force
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	2 Faces	4 Faces
Definition		
Type	Fixed Support	Force
Suppressed	No	
Define By		Components
Applied By		Surface Effect
Coordinate System		Global Coordinate System
X Component		0. N (ramped)
Y Component		0. N (ramped)
Z Component		1900. N (ramped)

Solution (A6)

TABLE 13
Model (A4, B4, C4) > Static Structural (A5) > Solution

Object Name	<i>Solution (A6)</i>
-------------	----------------------

State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	4. s
MAPDL Memory Used	568. MB
MAPDL Result File Size	12.25 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 14
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0
Update Interval	2.5 s
Display Points	All
FE Connection Visibility	
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 15
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Results

Object Name	Total Deformation	Equivalent Elastic Strain	Equivalent Stress
State	Solved		
Scope			
Scoping Method	Geometry Selection		
Geometry	All Bodies		
Definition			
Type	Total Deformation	Equivalent Elastic Strain	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	2.5468e-009 m/m	99.466 Pa
Maximum	9.991e-005 m	1.9684e-004 m/m	3.9183e+007 Pa
Average	2.625e-005 m	4.3723e-005 m/m	8.0964e+006 Pa
Minimum Occurs On	Solid		
Maximum Occurs On	Solid		

Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	
Integration Point Results		
Display Option		Averaged
Average Across Bodies		No

FIGURE 2
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Total Deformation

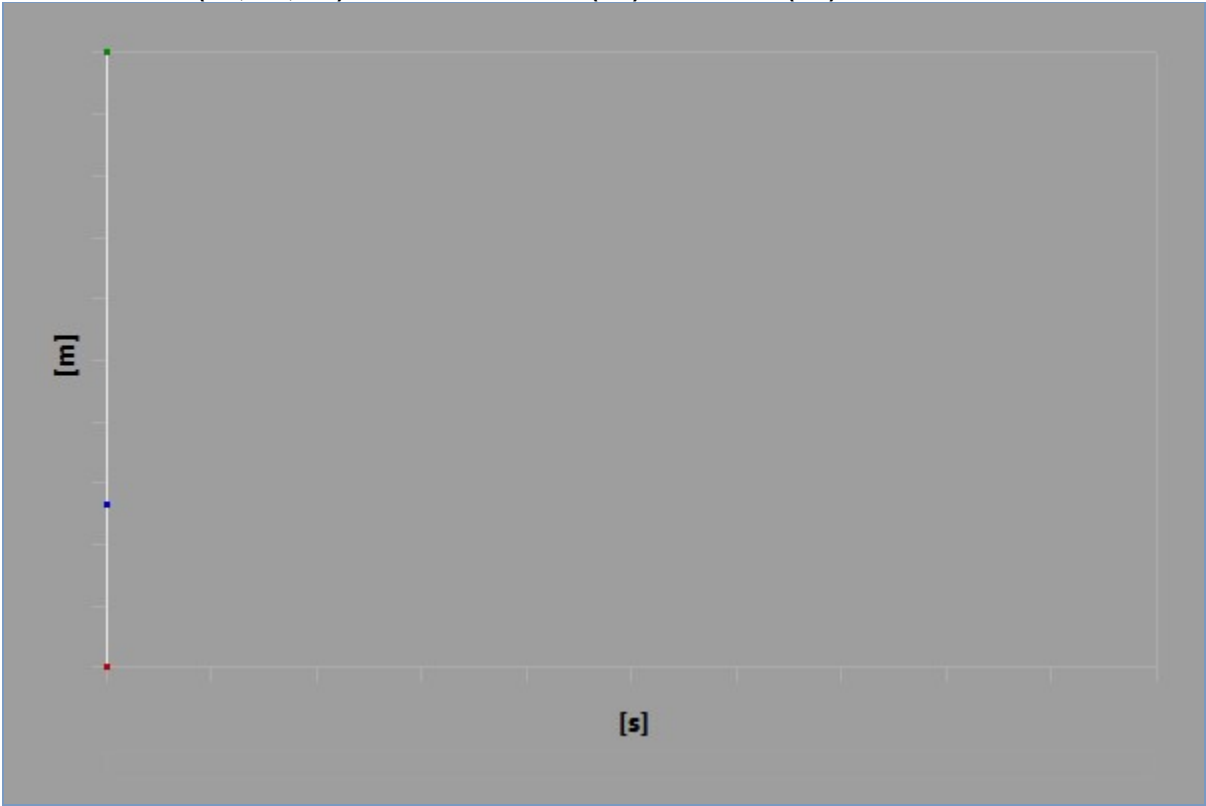


TABLE 16
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Total Deformation

Time [s]	Minimum [m]	Maximum [m]	Average [m]
1.	0.	9.991e-005	2.625e-005

FIGURE 3
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Total Deformation > Figure

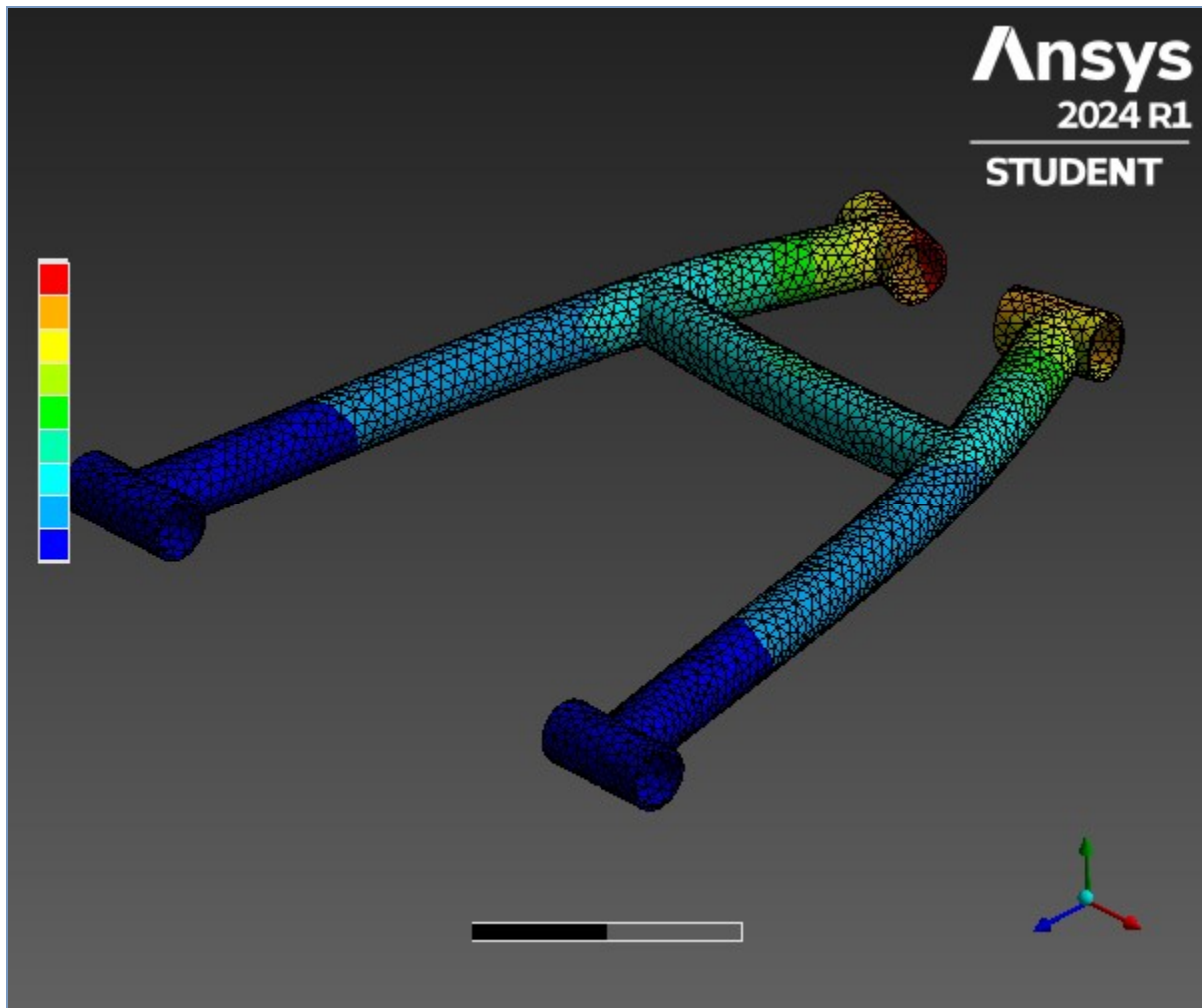
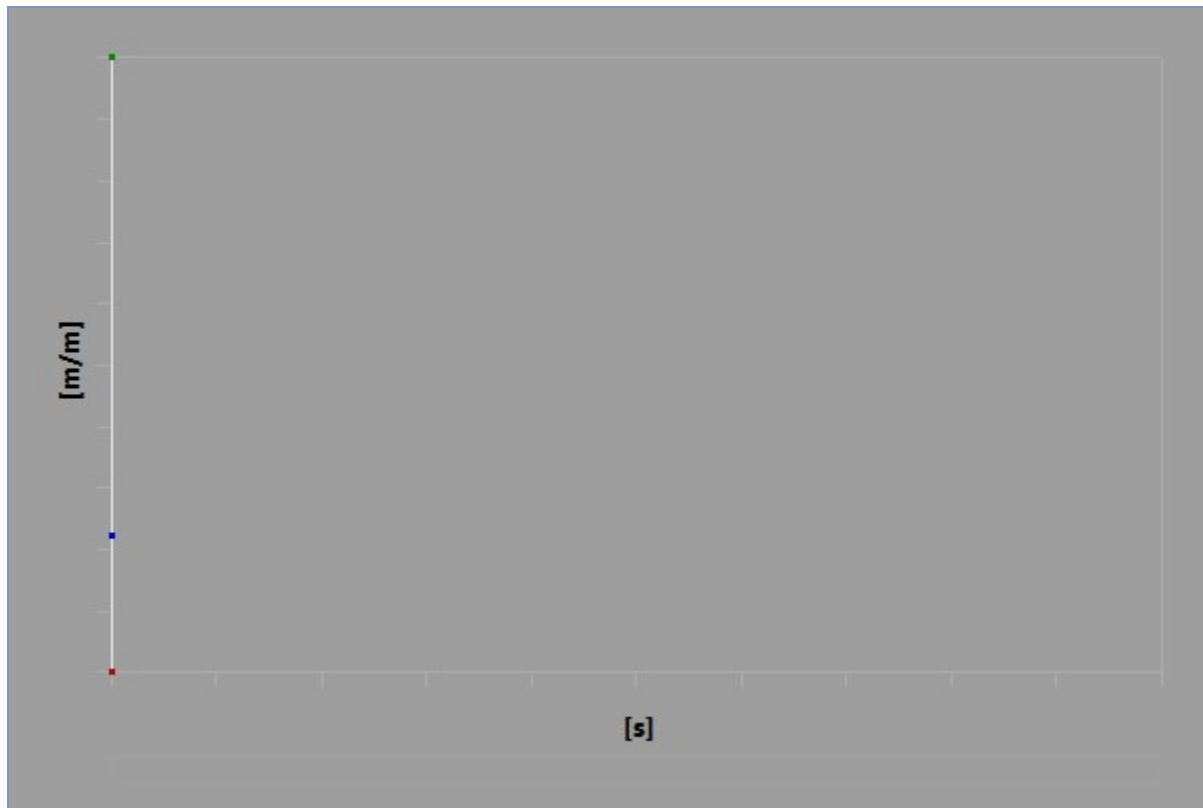


FIGURE 4
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain

**TABLE 17****Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain**

Time [s]	Minimum [m/m]	Maximum [m/m]	Average [m/m]
1.	2.5468e-009	1.9684e-004	4.3723e-005

FIGURE 5**Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain > Figure**

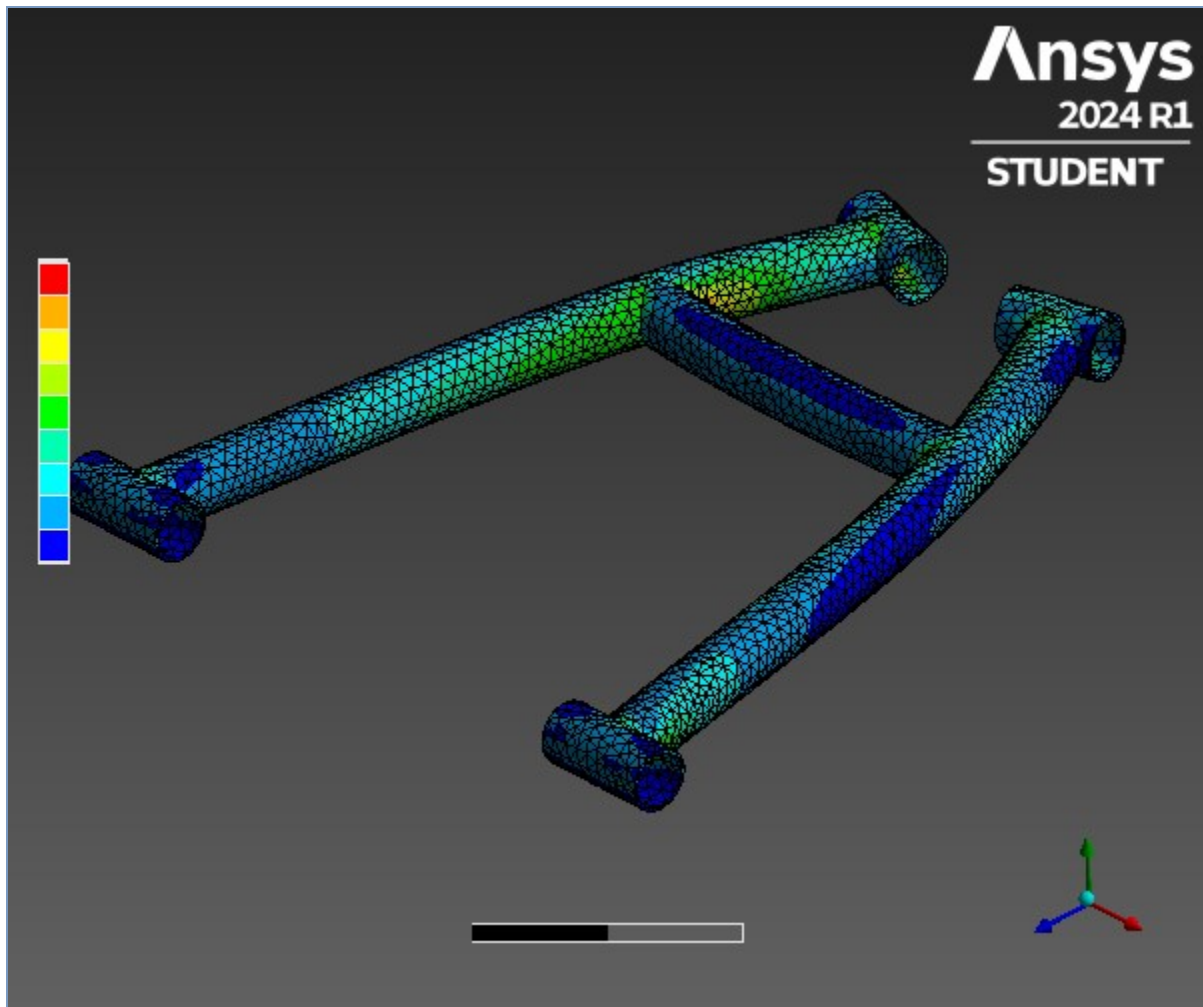
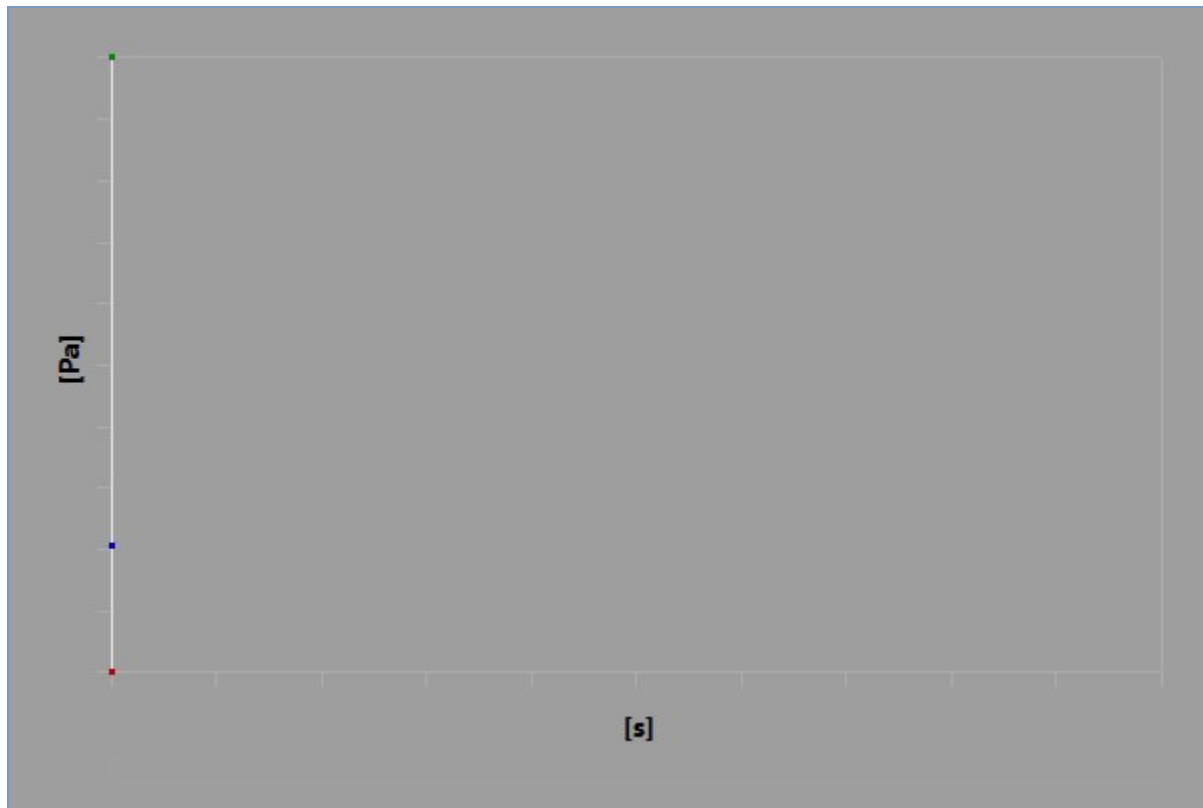
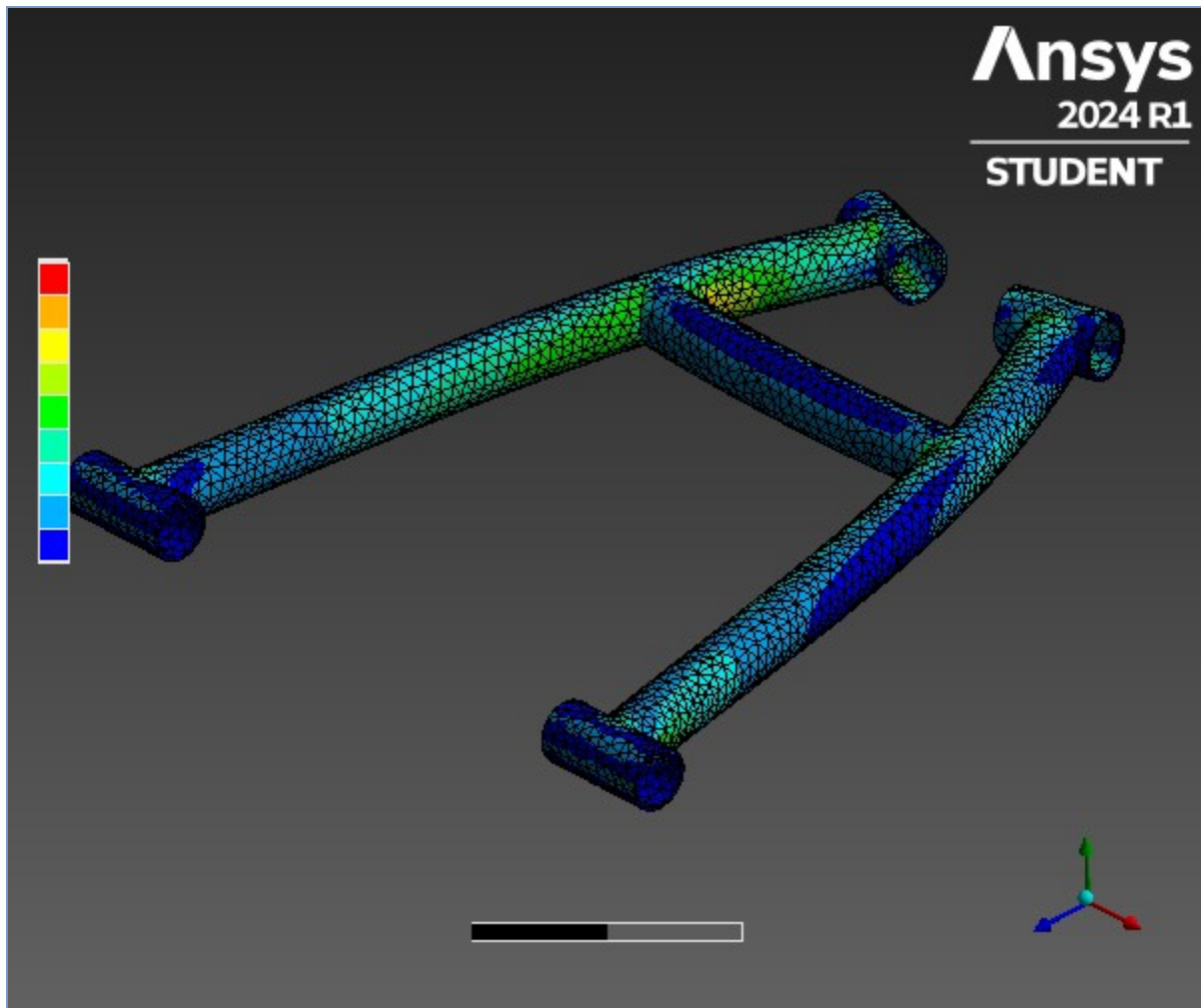


FIGURE 6
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Equivalent Stress

**TABLE 18****Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Equivalent Stress**

Time [s]	Minimum [Pa]	Maximum [Pa]	Average [Pa]
1.	99.466	3.9183e+007	8.0964e+006

FIGURE 7**Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Equivalent Stress > Figure**

**TABLE 19****Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Safety Tools**

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

TABLE 20**Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool > Results**

Object Name	Safety Factor	Safety Margin
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Safety Factor	Safety Margin
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	6.3803	5.3803
Minimum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 8
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor

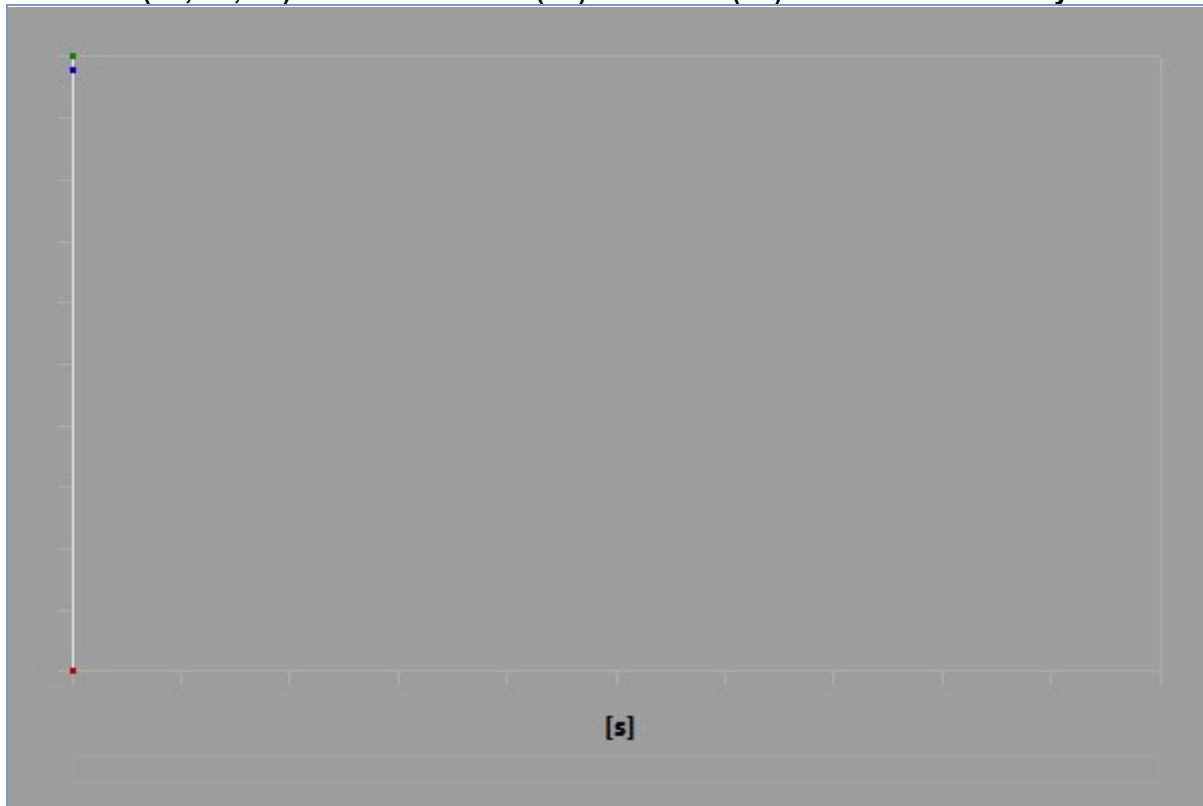


TABLE 21
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor

Time [s]	Minimum	Maximum	Average
1.	6.3803	15.	14.804

FIGURE 9
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Factor > Figure

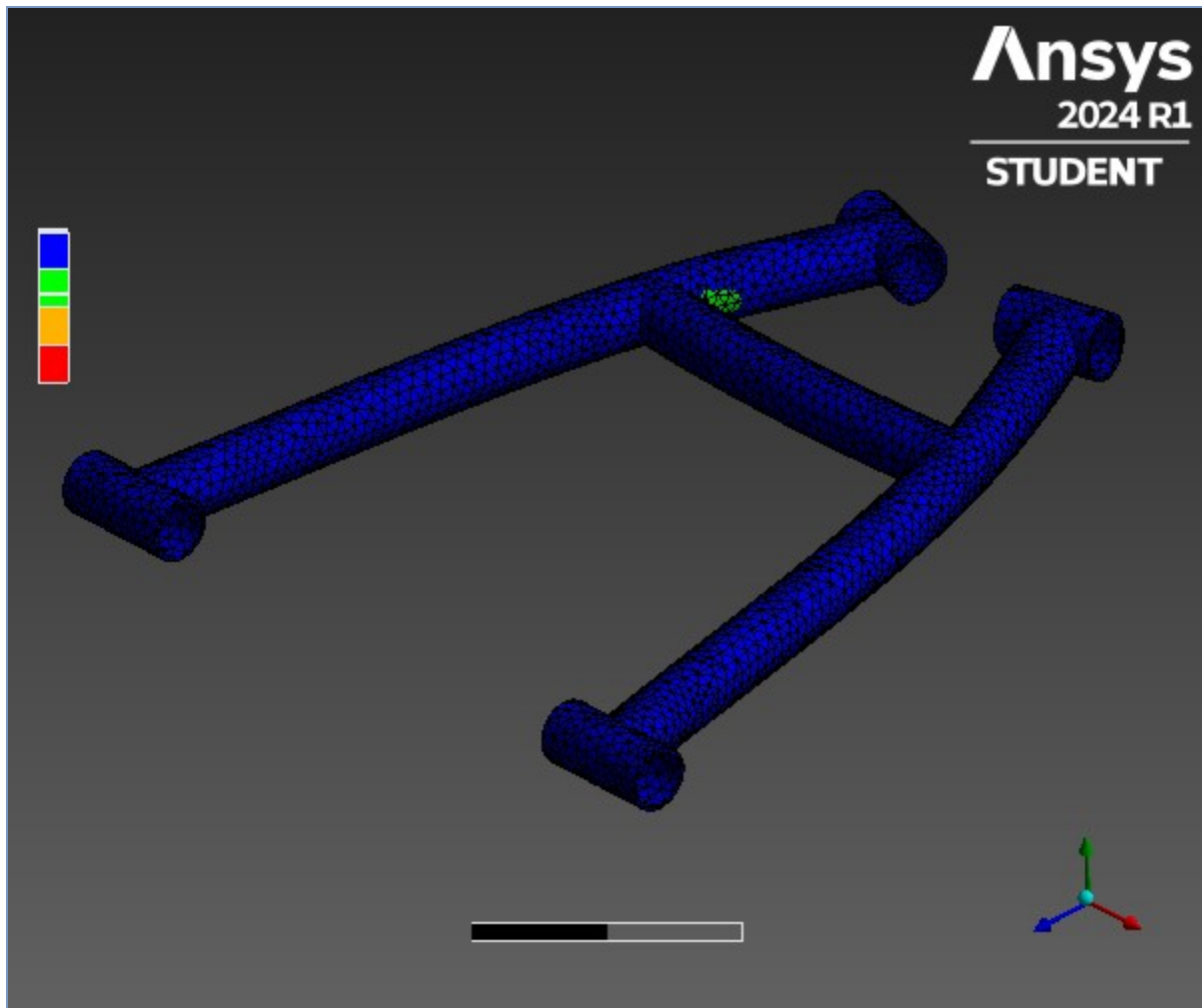
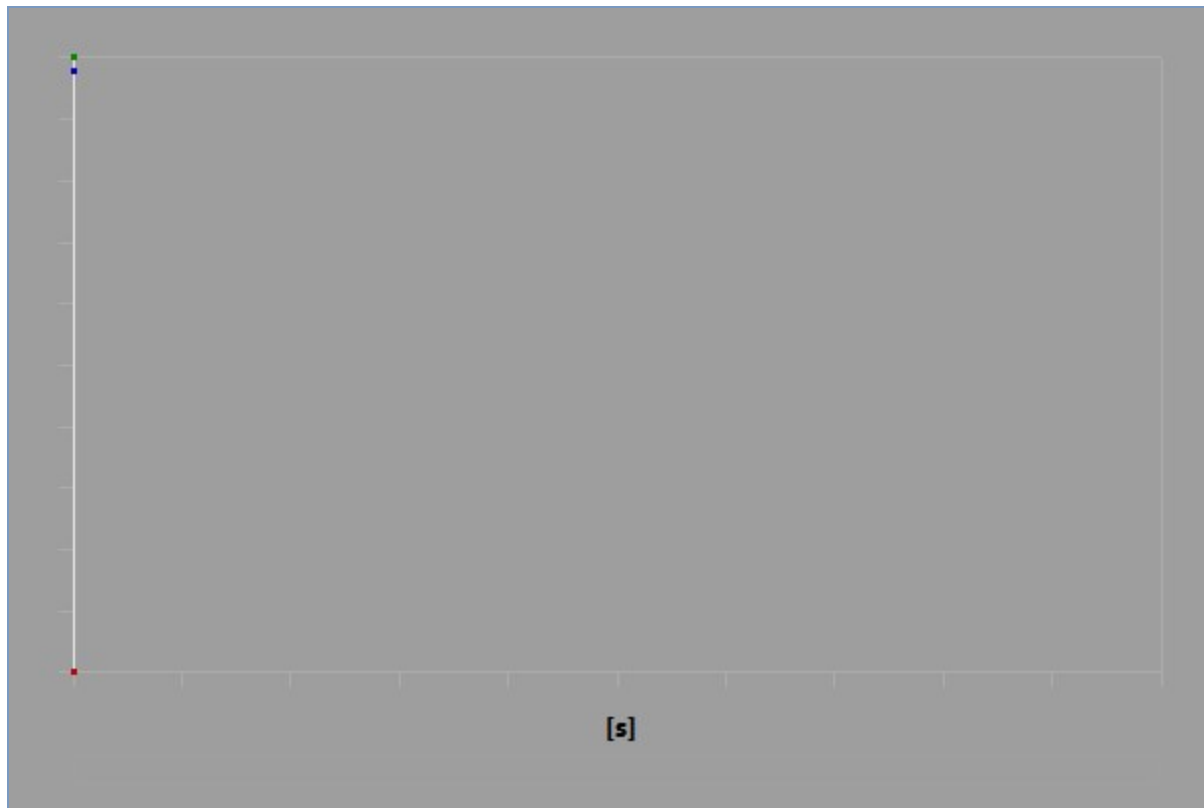


FIGURE 10
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Margin

**TABLE 22****Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Margin**

Time [s]	Minimum	Maximum	Average
1.	5.3803	14.	13.804

FIGURE 11**Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool > Safety Margin > Figure**

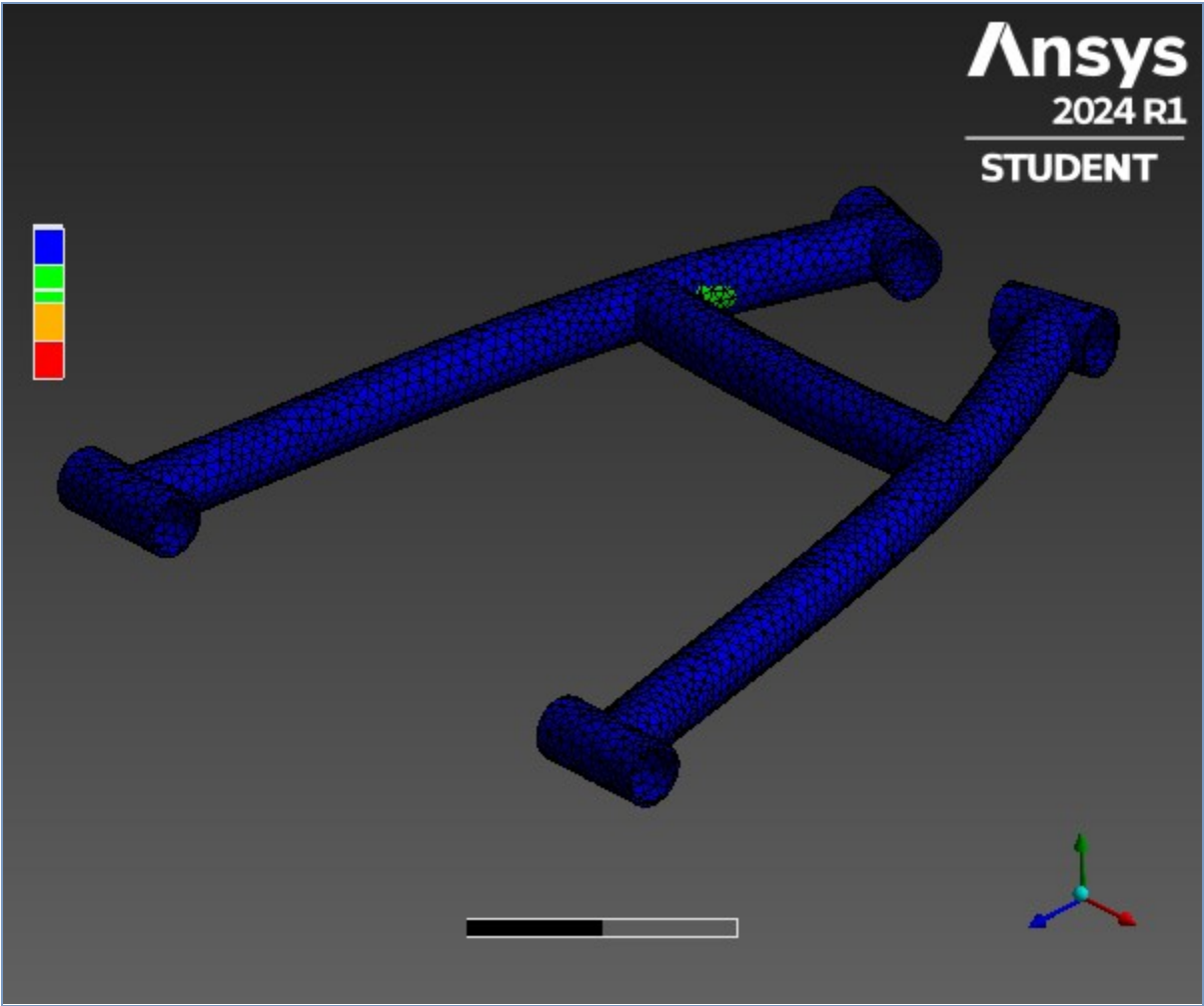


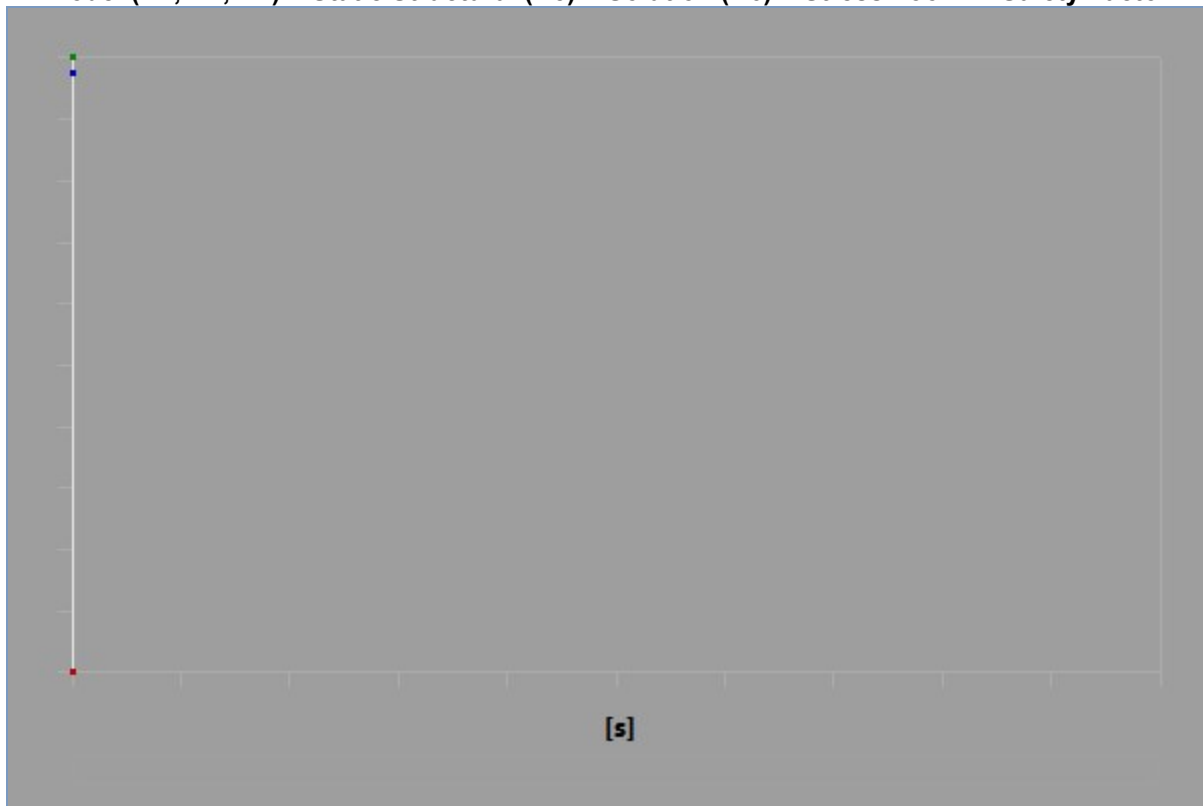
TABLE 23
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Safety Tools

Object Name	<i>Stress Tool 2</i>
State	Solved
Definition	
Theory	Max Shear Stress
Factor	0.5
Stress Limit Type	Tensile Yield Per Material

TABLE 24
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool 2 > Results

Object Name	<i>Safety Factor</i>	<i>Safety Margin</i>
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Safety Factor	Safety Margin
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	5.5528	4.5528
Minimum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 12**Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool 2 > Safety Factor****TABLE 25****Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool 2 > Safety Factor**

Time [s]	Minimum	Maximum	Average
1.	5.5528	15.	14.757

FIGURE 13**Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool 2 > Safety Factor > Figure**

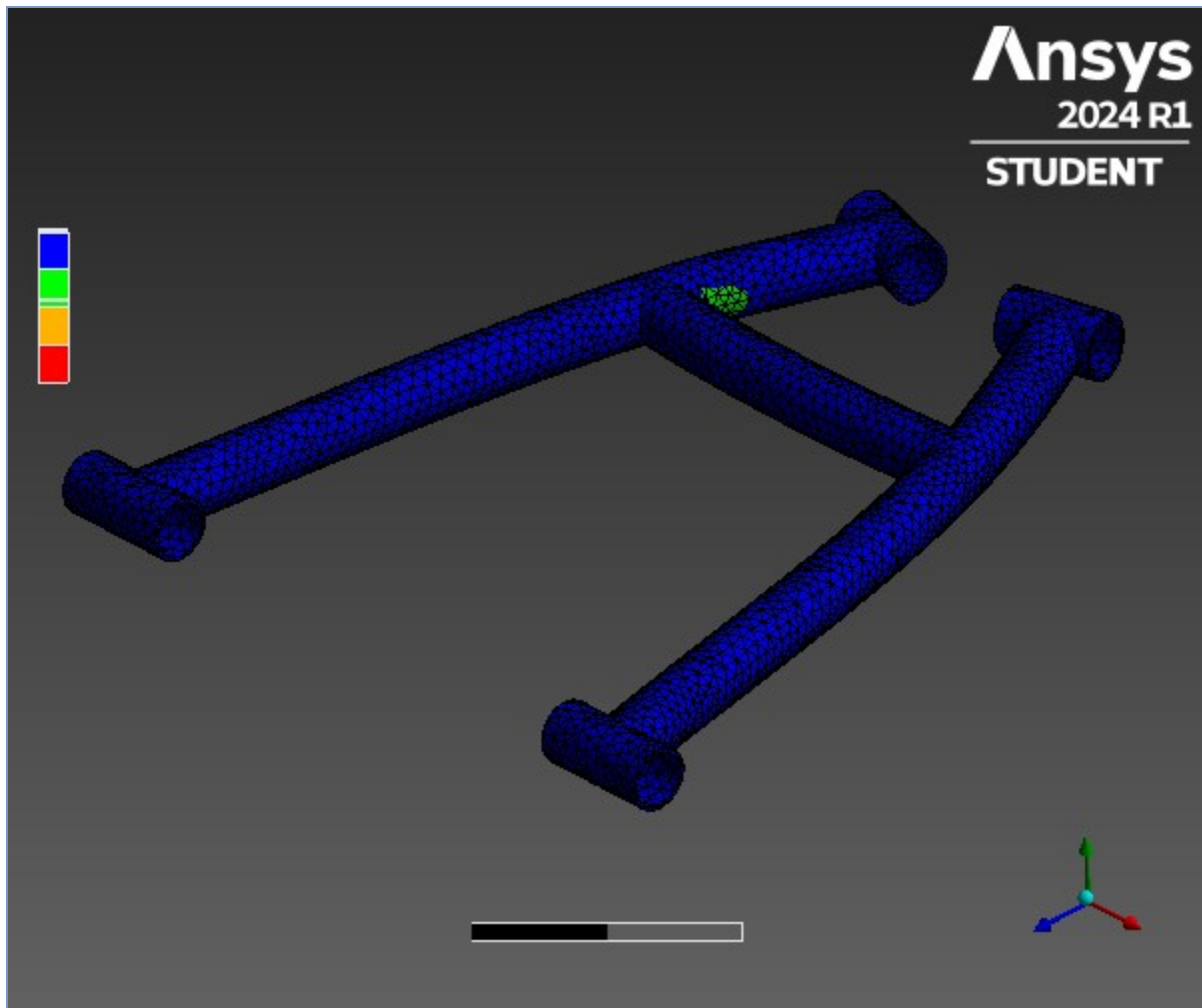
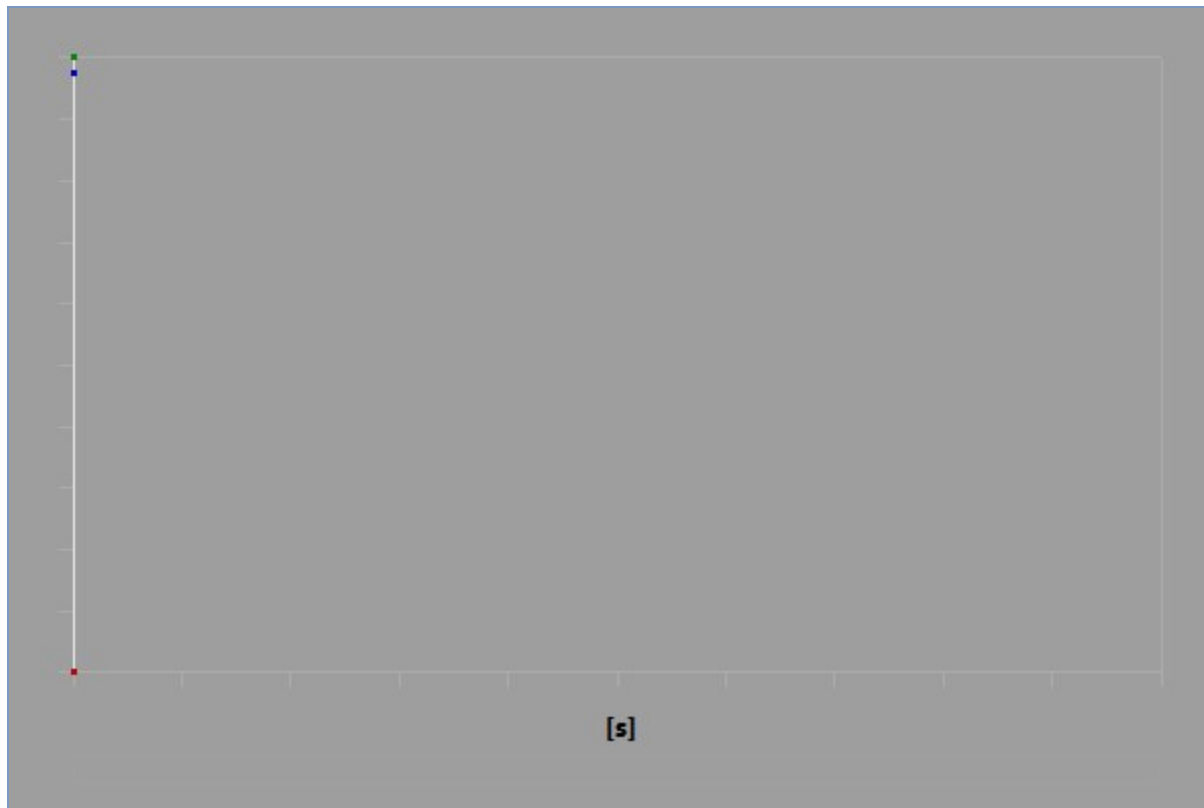
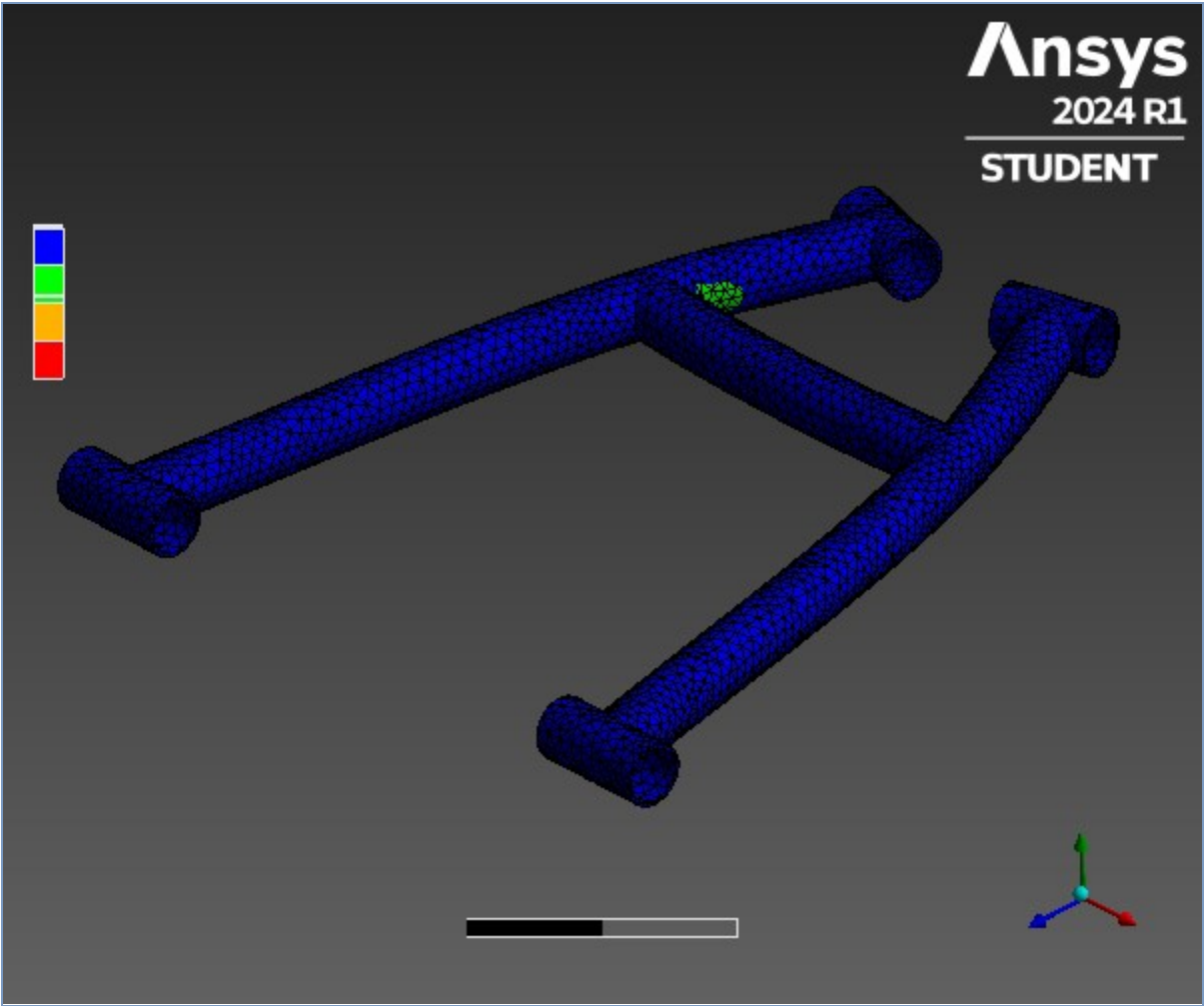


FIGURE 14
Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool 2 > Safety Margin

**TABLE 26****Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool 2 > Safety Margin**

Time [s]	Minimum	Maximum	Average
1.	4.5528	14.	13.757

FIGURE 15**Model (A4, B4, C4) > Static Structural (A5) > Solution (A6) > Stress Tool 2 > Safety Margin > Figure**



Static Structural 2 (C5)

TABLE 27
Model (A4, B4, C4) > Analysis

Object Name	Static Structural 2 (C5)
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 28
Model (A4, B4, C4) > Static Structural 2 (C5) > 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	
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\91982\AppData\Local\Temp\WB_91982_26208_2\wbnew_files\dp0\SYS-1\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 16
Model (A4, B4, C4) > Static Structural 2 (C5) > Figure

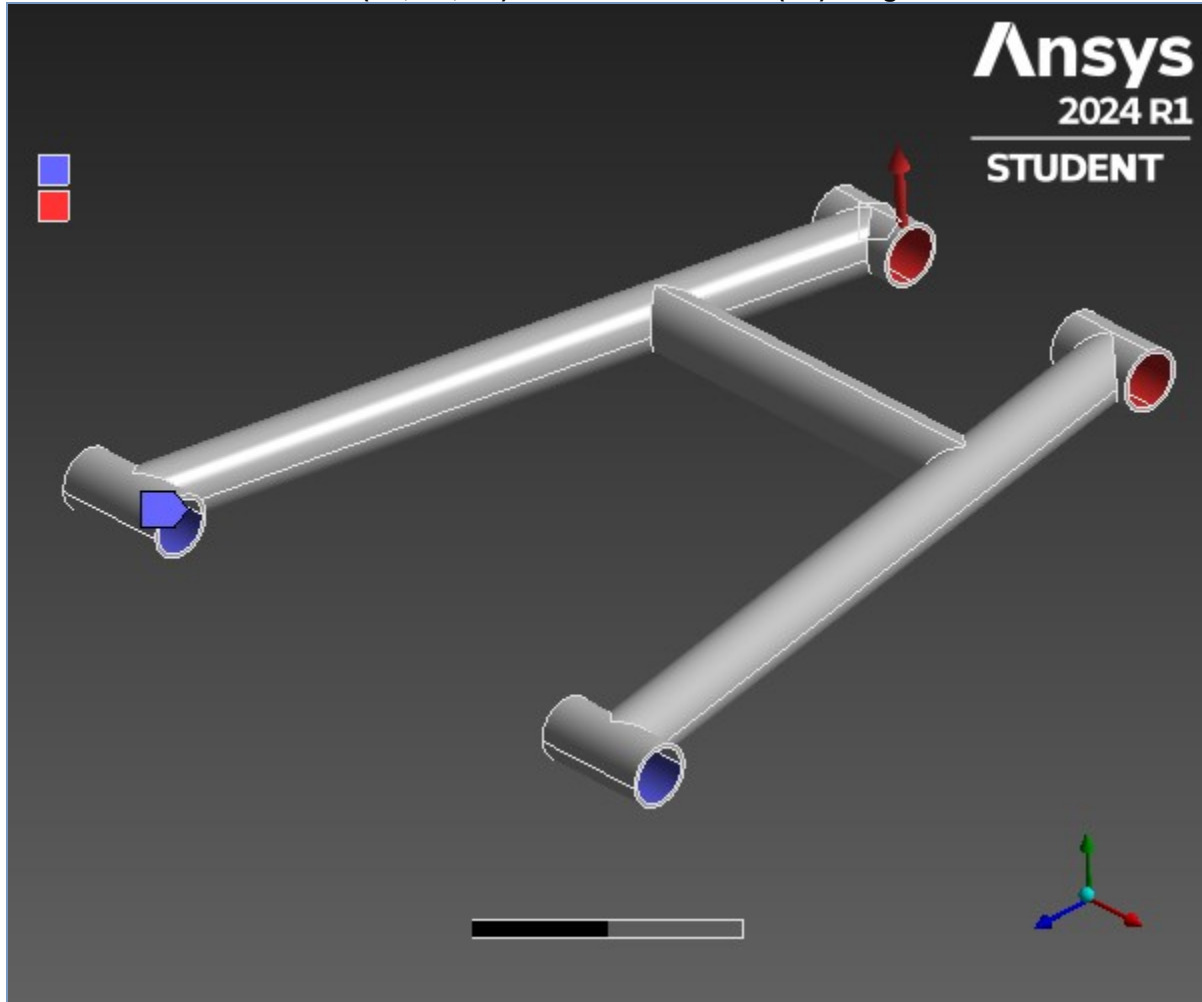


TABLE 29
Model (A4, B4, C4) > Static Structural 2 (C5) > Loads

Object Name	Fixed Support	Force
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	2 Faces	4 Faces
Definition		
Type	Fixed Support	Force
Suppressed	No	
Define By		Components
Applied By		Surface Effect
Coordinate System		Global Coordinate System
X Component		0. N (ramped)
Y Component		3000. N (ramped)
Z Component		0. N (ramped)

Solution (C6)

TABLE 30
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution

Object Name	<i>Solution (C6)</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	4. s
MAPDL Memory Used	568. MB
MAPDL Result File Size	12.25 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 31
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0
Update Interval	2.5 s
Display Points	All
FE Connection Visibility	
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 32
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Results

Object Name	Total Deformation	Equivalent Elastic Strain	Equivalent Stress
State	Solved		
Scope			
Scoping Method	Geometry Selection		
Geometry	All Bodies		
Definition			
Type	Total Deformation	Equivalent Elastic Strain	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	1.4419e-007 m/m	6030.6 Pa
Maximum	1.1588e-002 m	6.6467e-003 m/m	1.1974e+009 Pa
Average	4.6917e-003 m	9.437e-004 m/m	1.72e+008 Pa
Minimum Occurs On	Solid		

Maximum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	
Integration Point Results		
Display Option		Averaged
Average Across Bodies		No

FIGURE 17
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Total Deformation

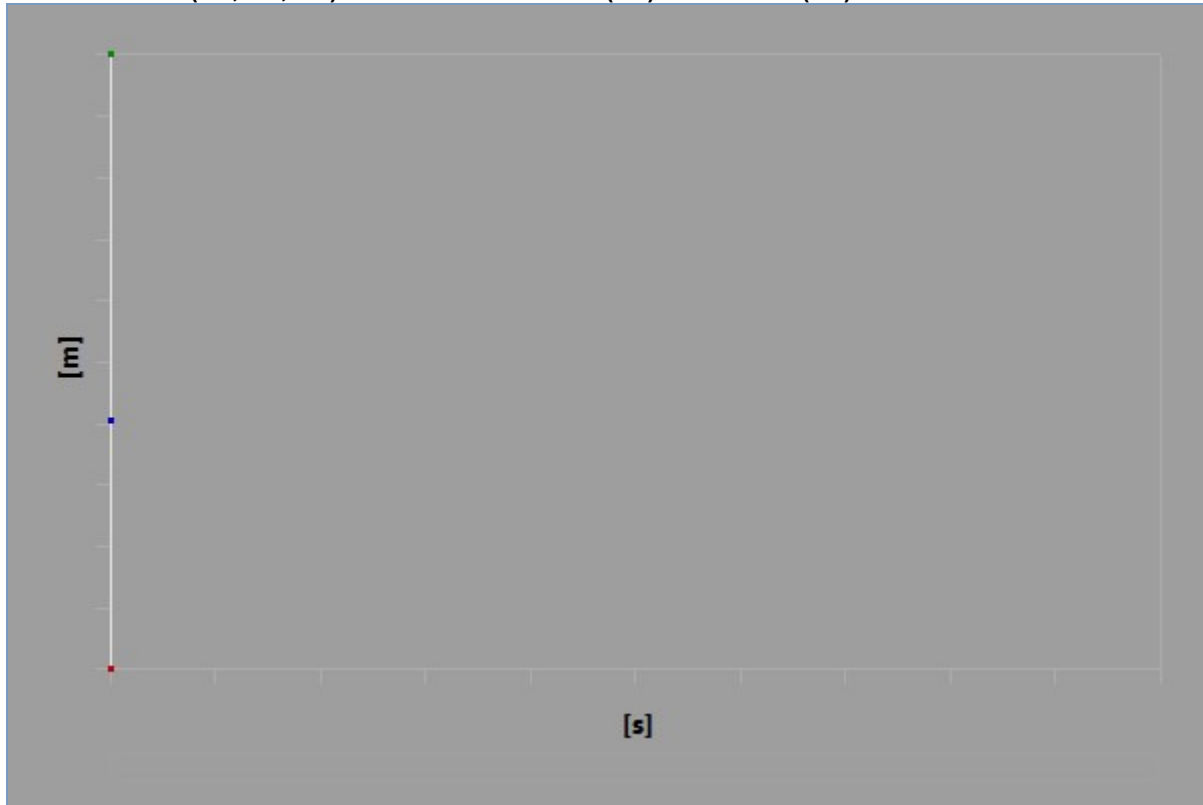


TABLE 33
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Total Deformation

Time [s]	Minimum [m]	Maximum [m]	Average [m]
1.	0.	1.1588e-002	4.6917e-003

FIGURE 18
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Total Deformation > Figure

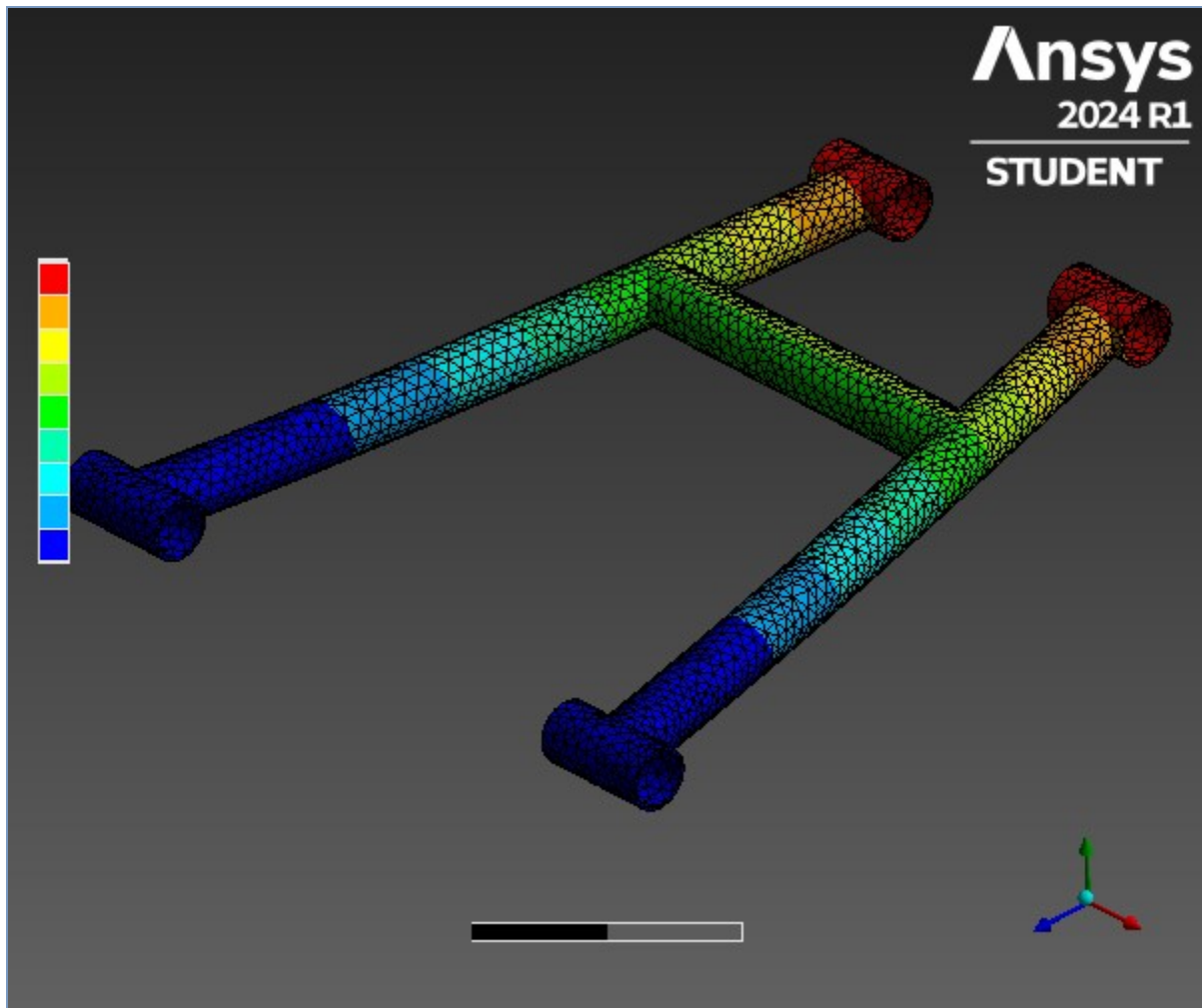
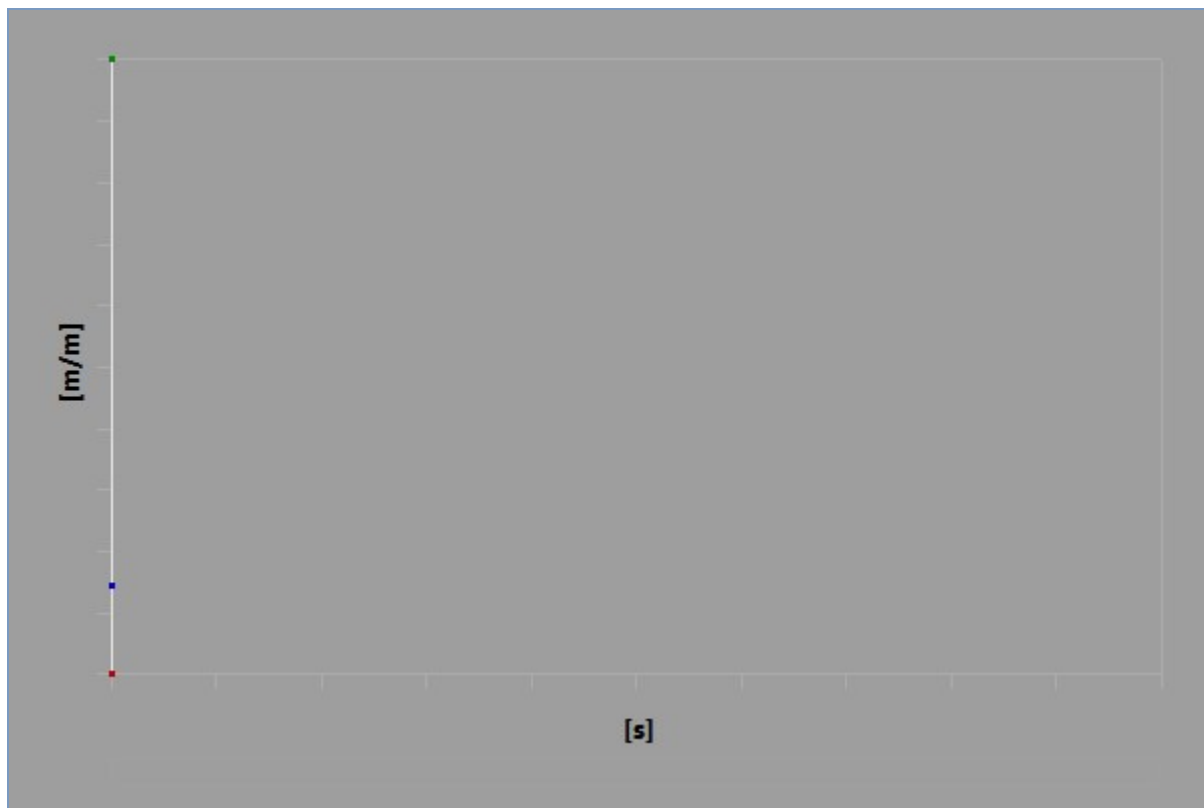


FIGURE 19
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Equivalent Elastic Strain

**TABLE 34****Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Equivalent Elastic Strain**

Time [s]	Minimum [m/m]	Maximum [m/m]	Average [m/m]
1.	1.4419e-007	6.6467e-003	9.437e-004

FIGURE 20**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Equivalent Elastic Strain > Figure**

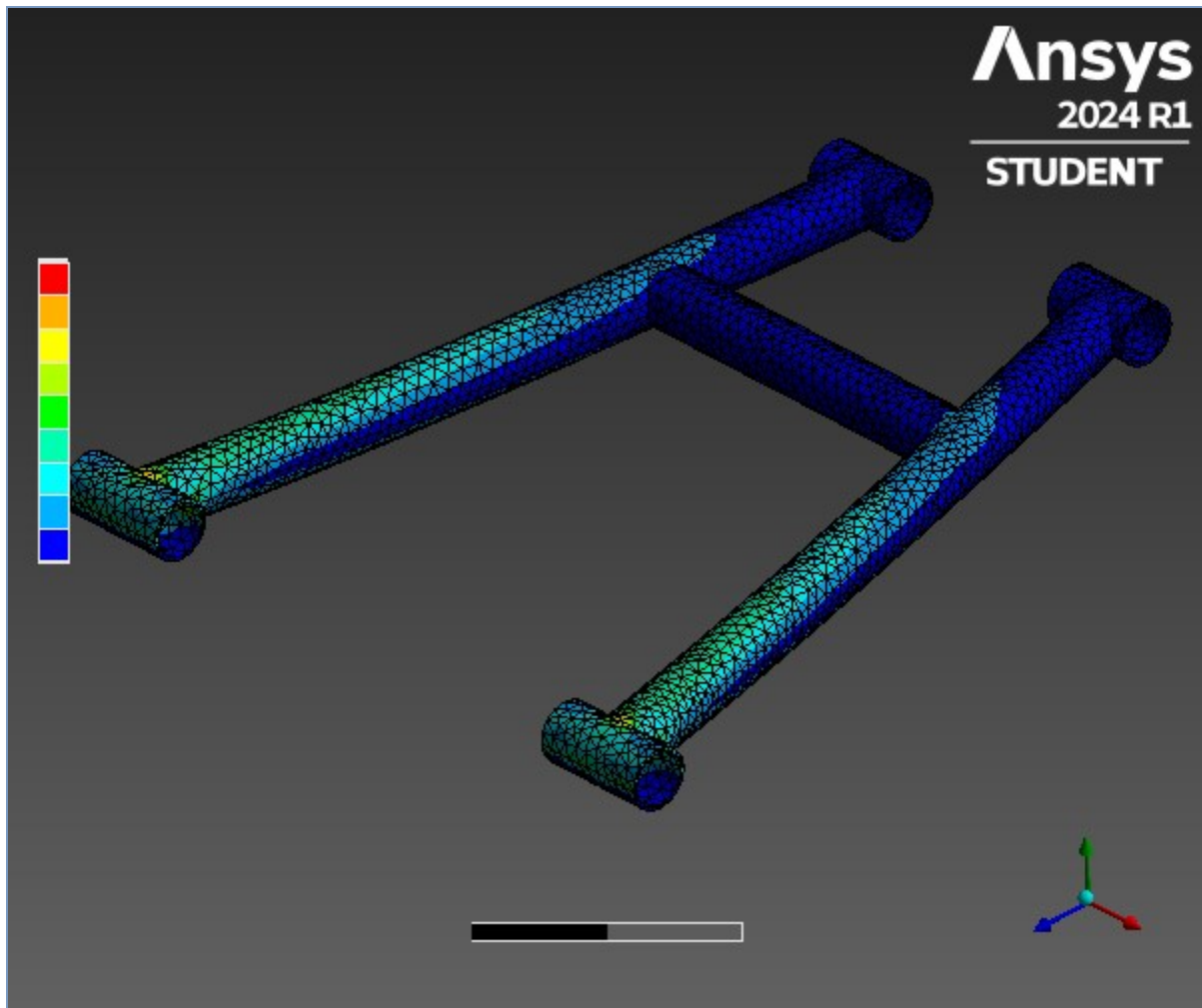
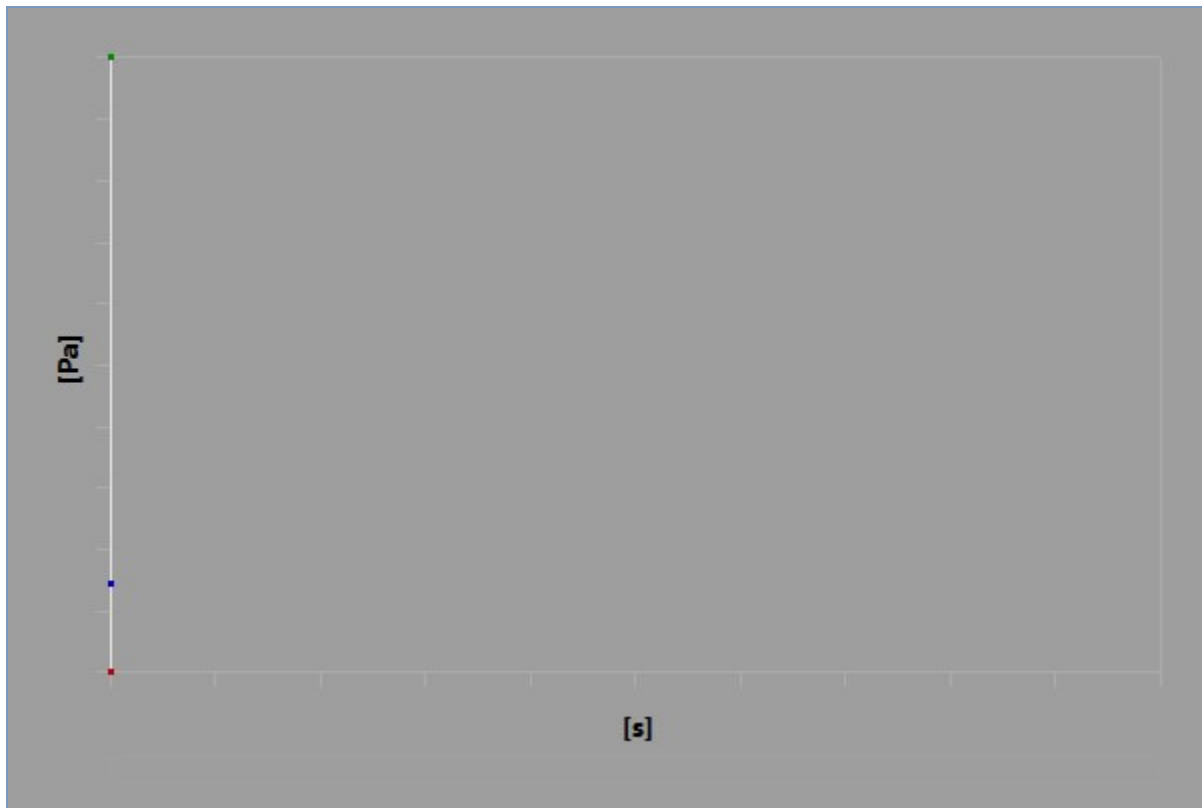


FIGURE 21
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Equivalent Stress

**TABLE 35****Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Equivalent Stress**

Time [s]	Minimum [Pa]	Maximum [Pa]	Average [Pa]
1.	6030.6	1.1974e+009	1.72e+008

FIGURE 22**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Equivalent Stress > Figure**

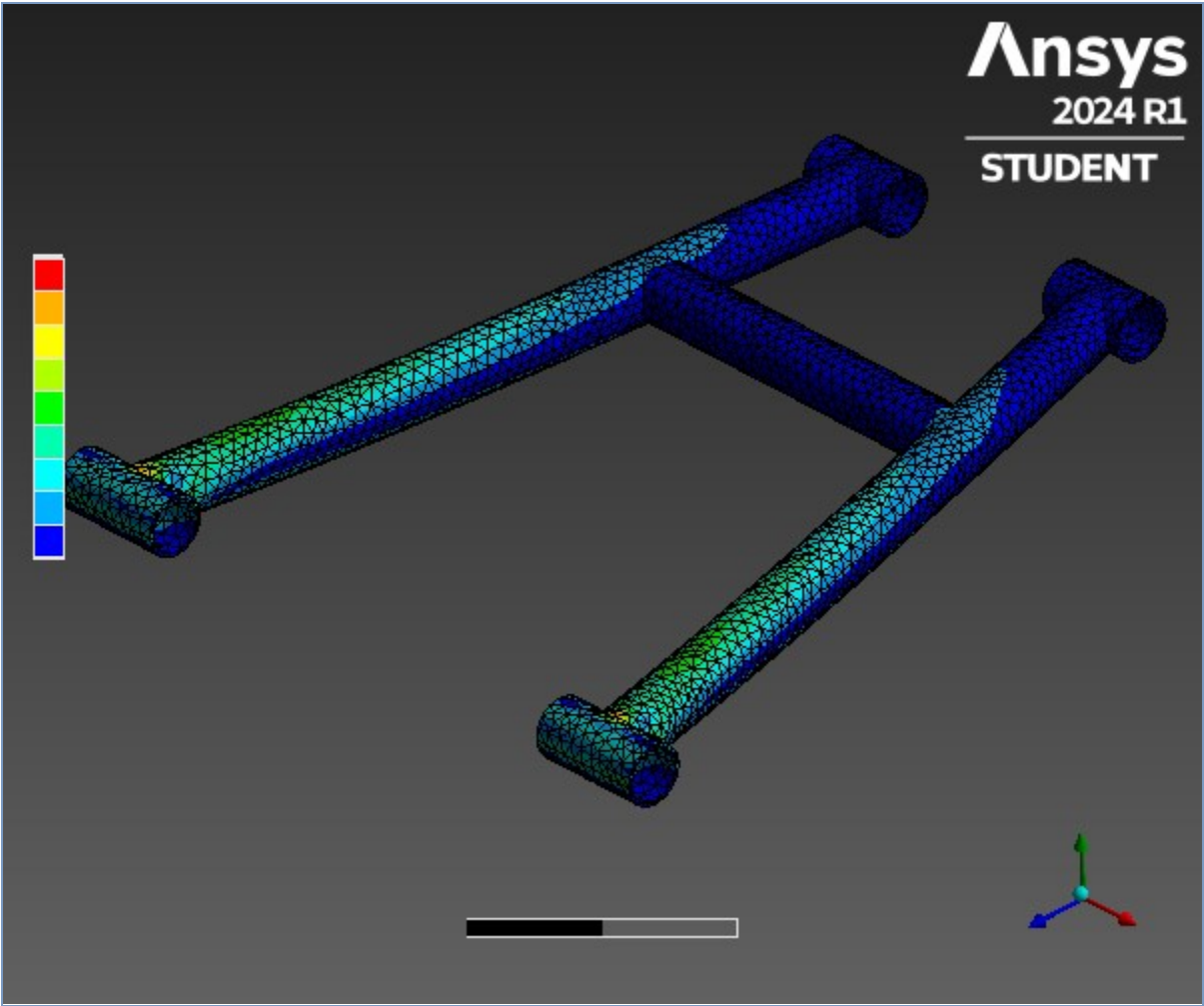


TABLE 36

Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Safety Tools

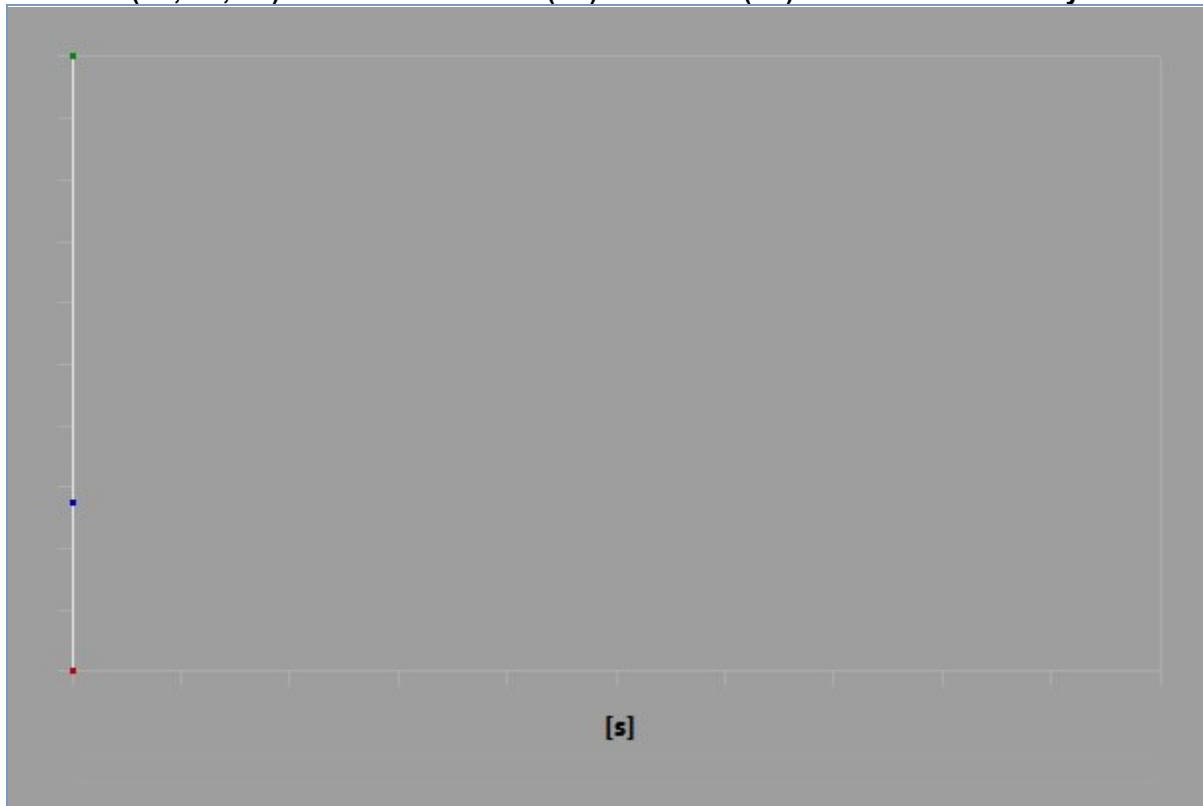
Object Name	Stress Tool
State	Solved
Definition	
Theory	Max Equivalent Stress
Stress Limit Type	Tensile Yield Per Material

TABLE 37

Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool > Results

Object Name	Safety Factor	Safety Margin
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Safety Factor	Safety Margin
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	0.20878	-0.79122
Minimum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 23**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool > Safety Factor****TABLE 38****Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool > Safety Factor**

Time [s]	Minimum	Maximum	Average
1.	0.20878	15.	4.2463

FIGURE 24**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool > Safety Factor > Figure**

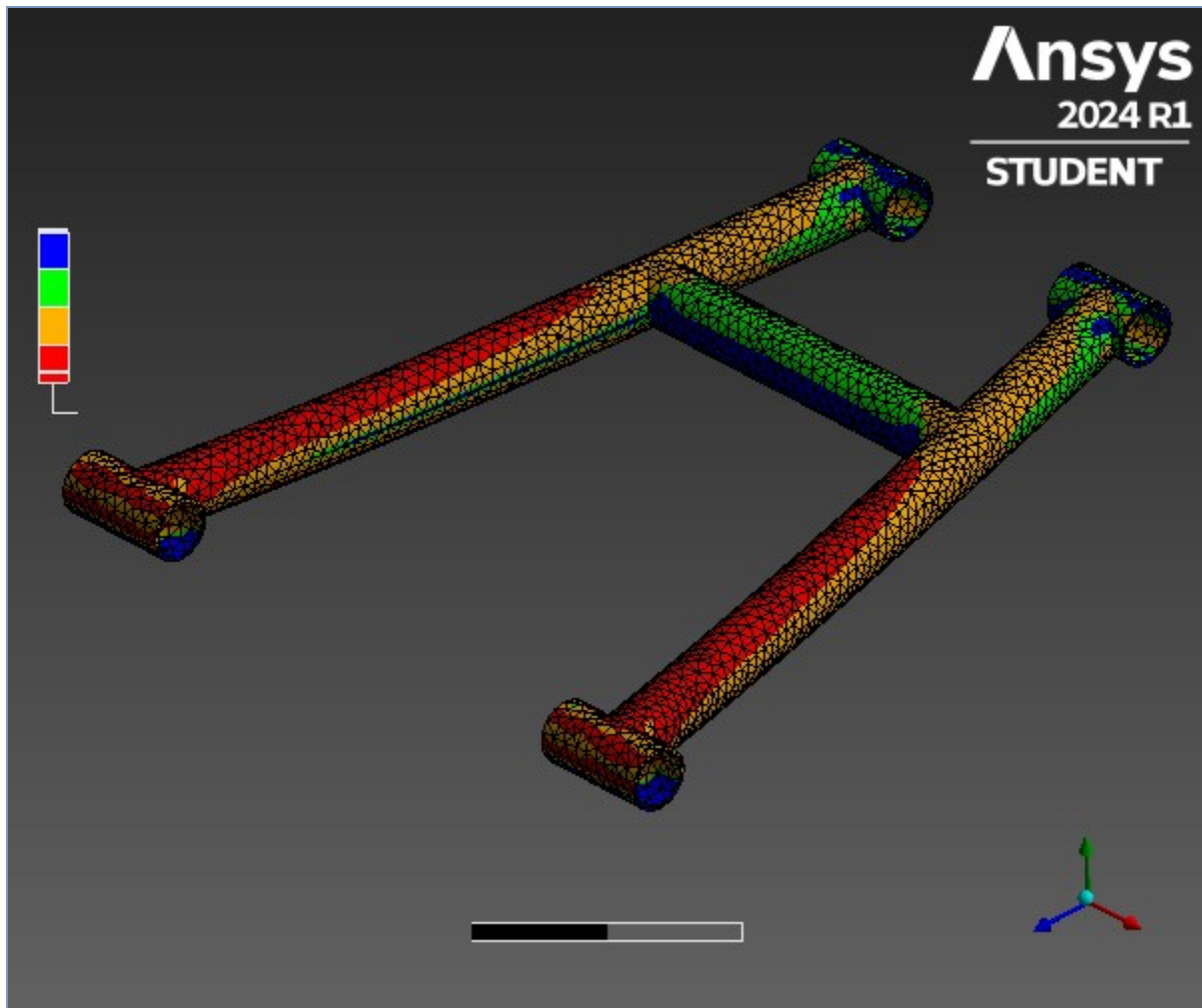


FIGURE 25
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool > Safety Margin

**TABLE 39****Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool > Safety Margin**

Time [s]	Minimum	Maximum	Average
1.	-0.79122	14.	3.2463

FIGURE 26**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool > Safety Margin > Figure**

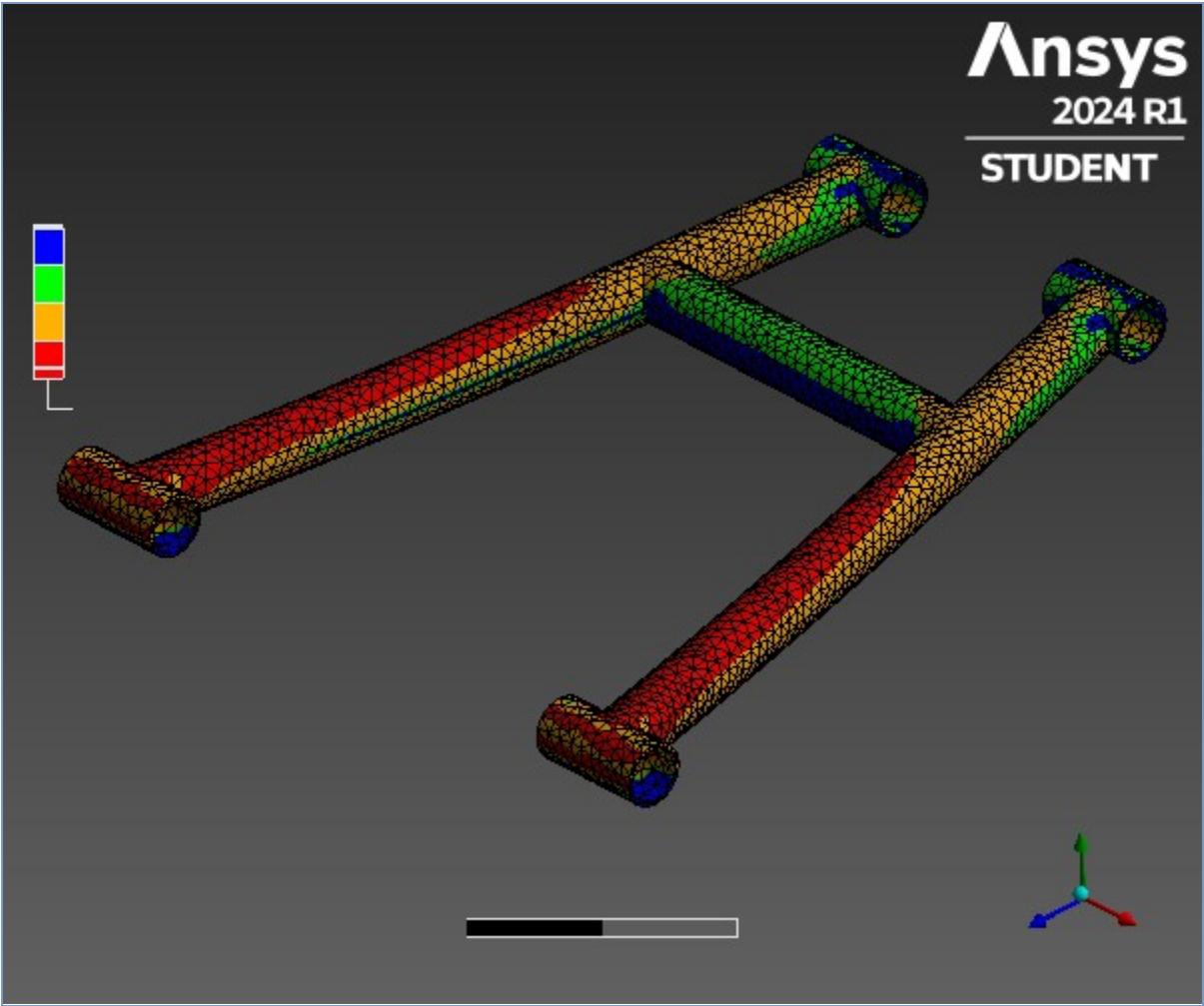


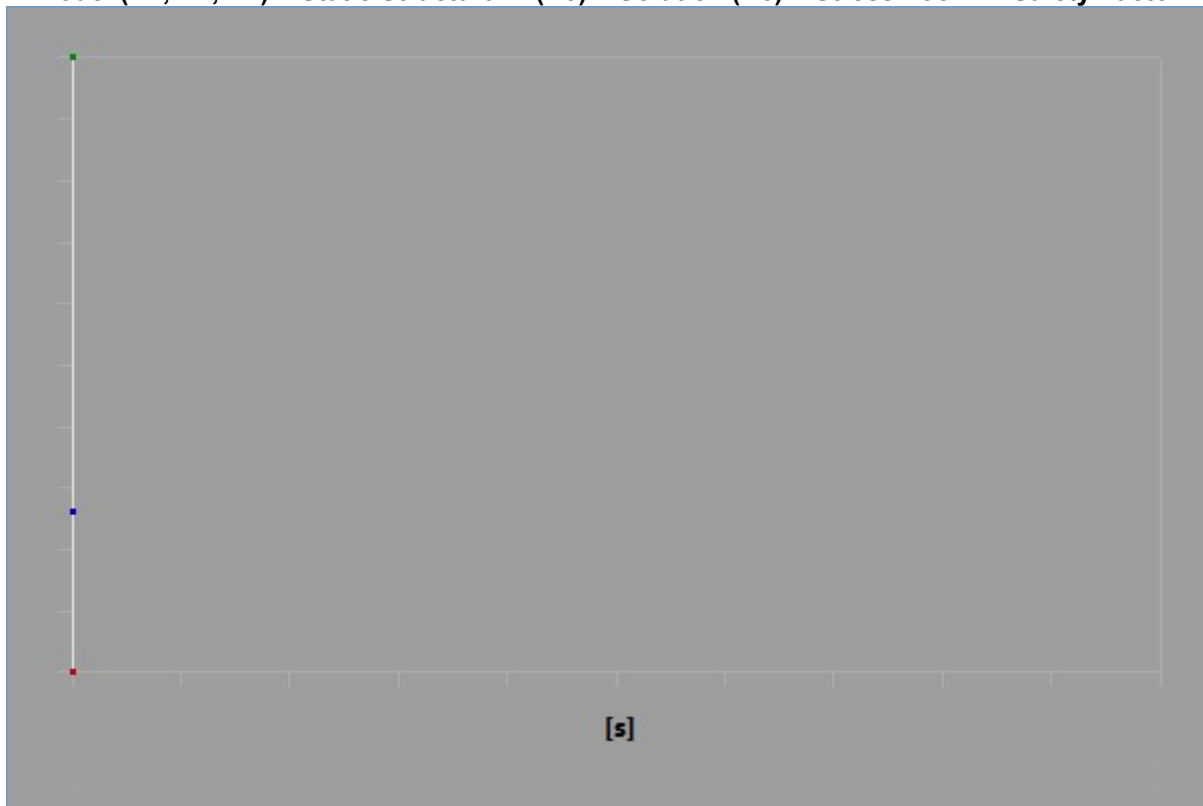
TABLE 40
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Safety Tools

Object Name	<i>Stress Tool 2</i>
State	Solved
Definition	
Theory	Max Shear Stress
Factor	0.5
Stress Limit Type	Tensile Yield Per Material

TABLE 41
Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool 2 > Results

Object Name	Safety Factor	Safety Margin
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Safety Factor	Safety Margin
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	0.18617	-0.81383
Minimum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 27**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool 2 > Safety Factor****TABLE 42****Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool 2 > Safety Factor**

Time [s]	Minimum	Maximum	Average
1.	0.18617	15.	4.0572

FIGURE 28**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool 2 > Safety Factor > Figure**

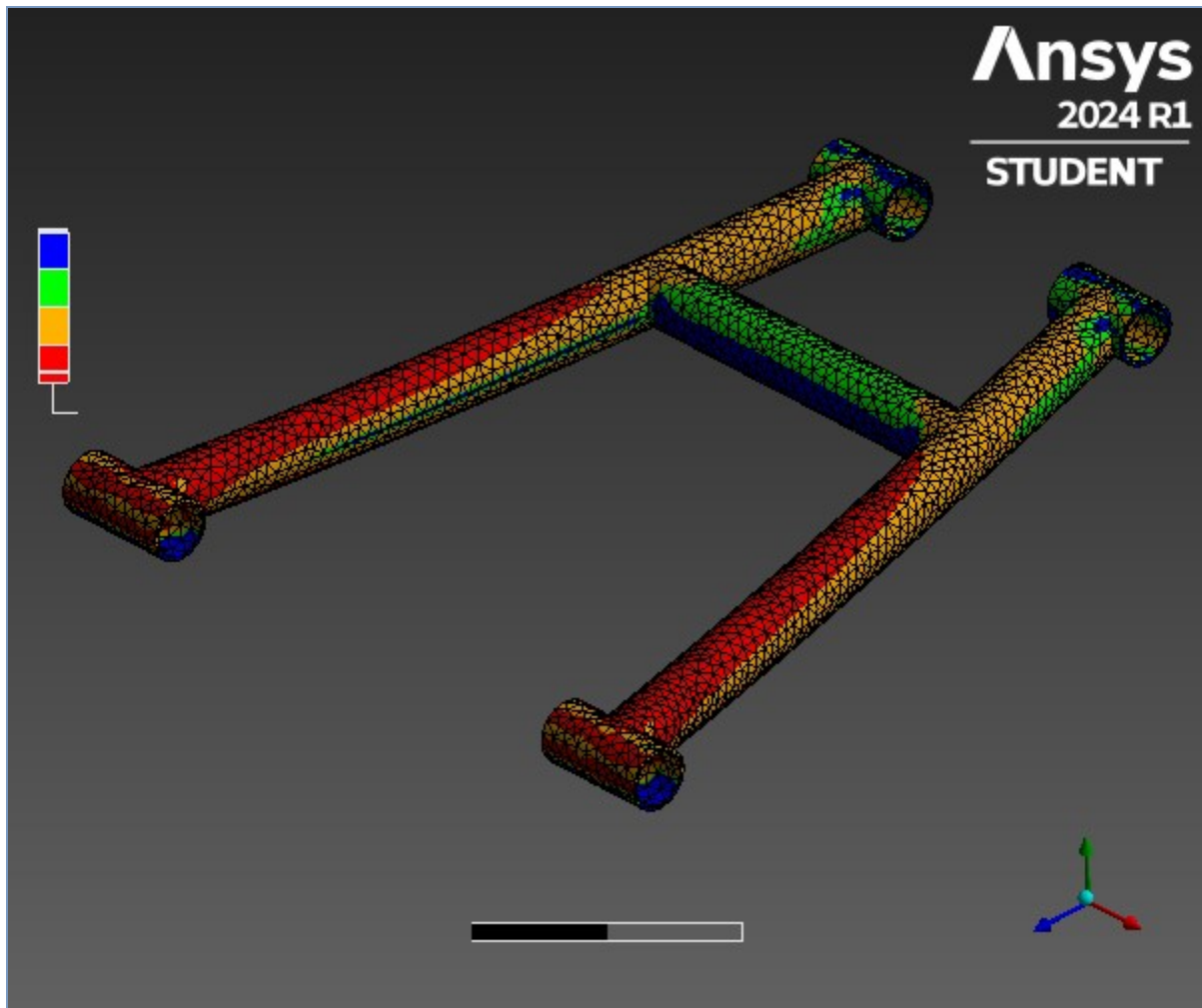
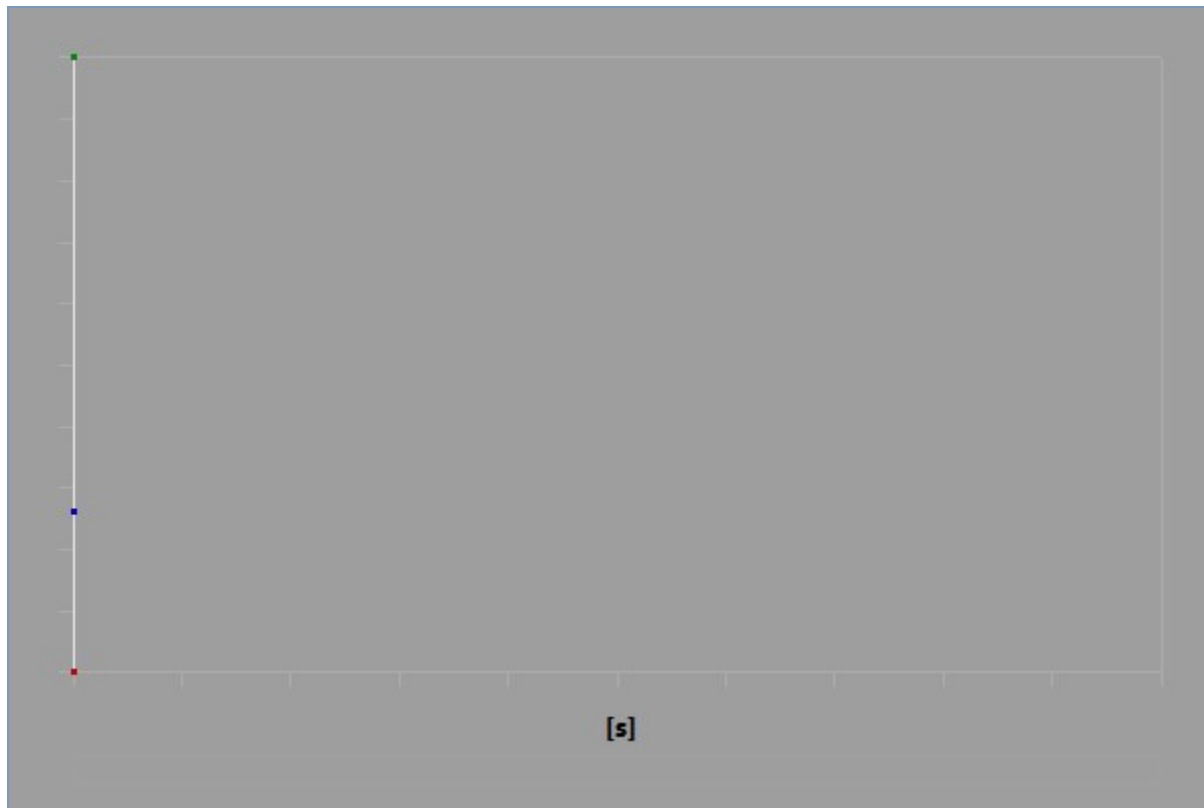


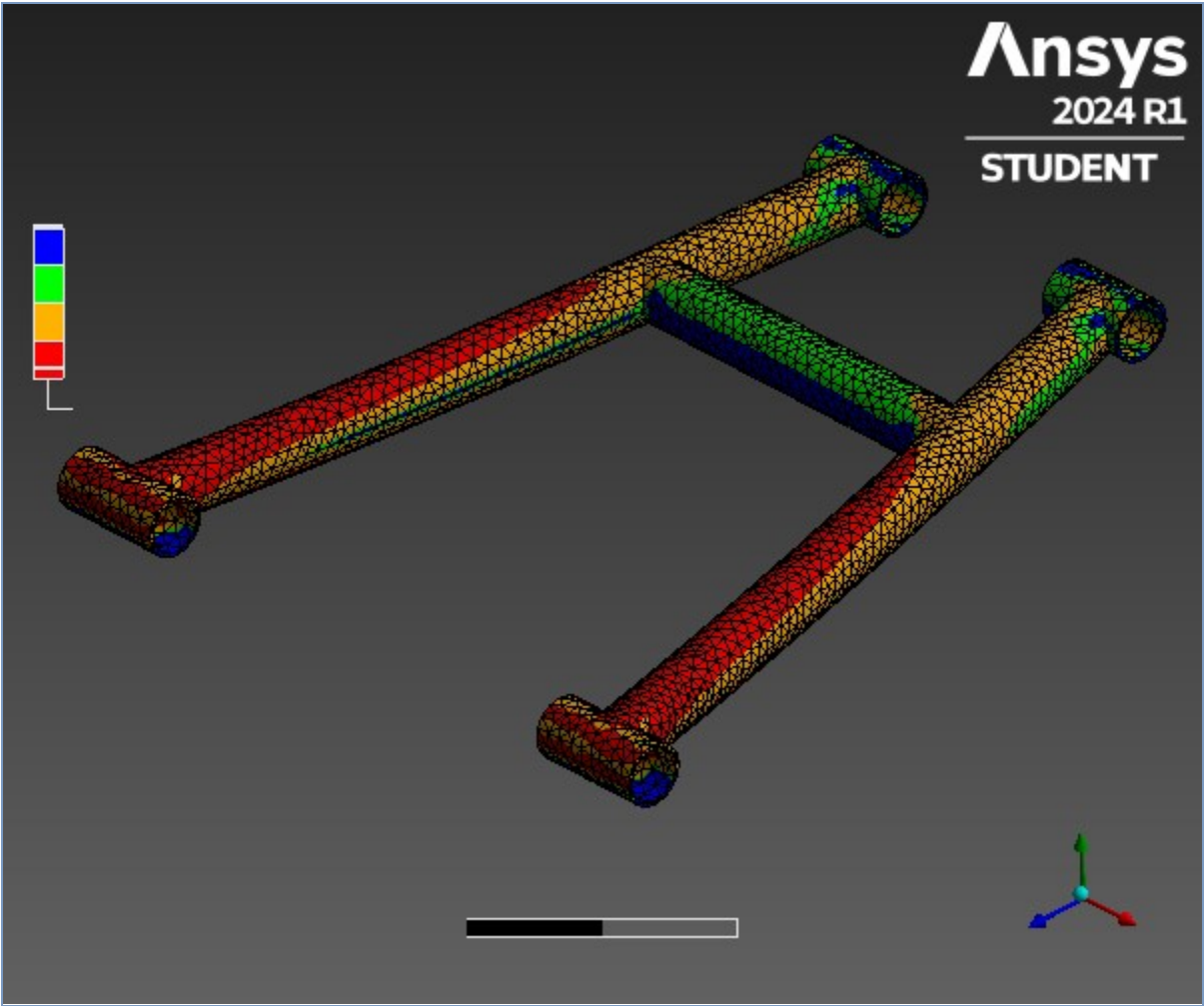
FIGURE 29

Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool 2 > Safety Margin

**TABLE 43****Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool 2 > Safety Margin**

Time [s]	Minimum	Maximum	Average
1.	-0.81383	14.	3.0572

FIGURE 30**Model (A4, B4, C4) > Static Structural 2 (C5) > Solution (C6) > Stress Tool 2 > Safety Margin > Figure**



Static Structural 3 (B5)

TABLE 44
Model (A4, B4, C4) > Analysis

Object Name	Static Structural 3 (B5)
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 45
Model (A4, B4, C4) > Static Structural 3 (B5) > 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	
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\91982\AppData\Local\Temp\WB_91982_26208_2\wbnew_files\dp0\SYS-2\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 31
Model (A4, B4, C4) > Static Structural 3 (B5) > Figure

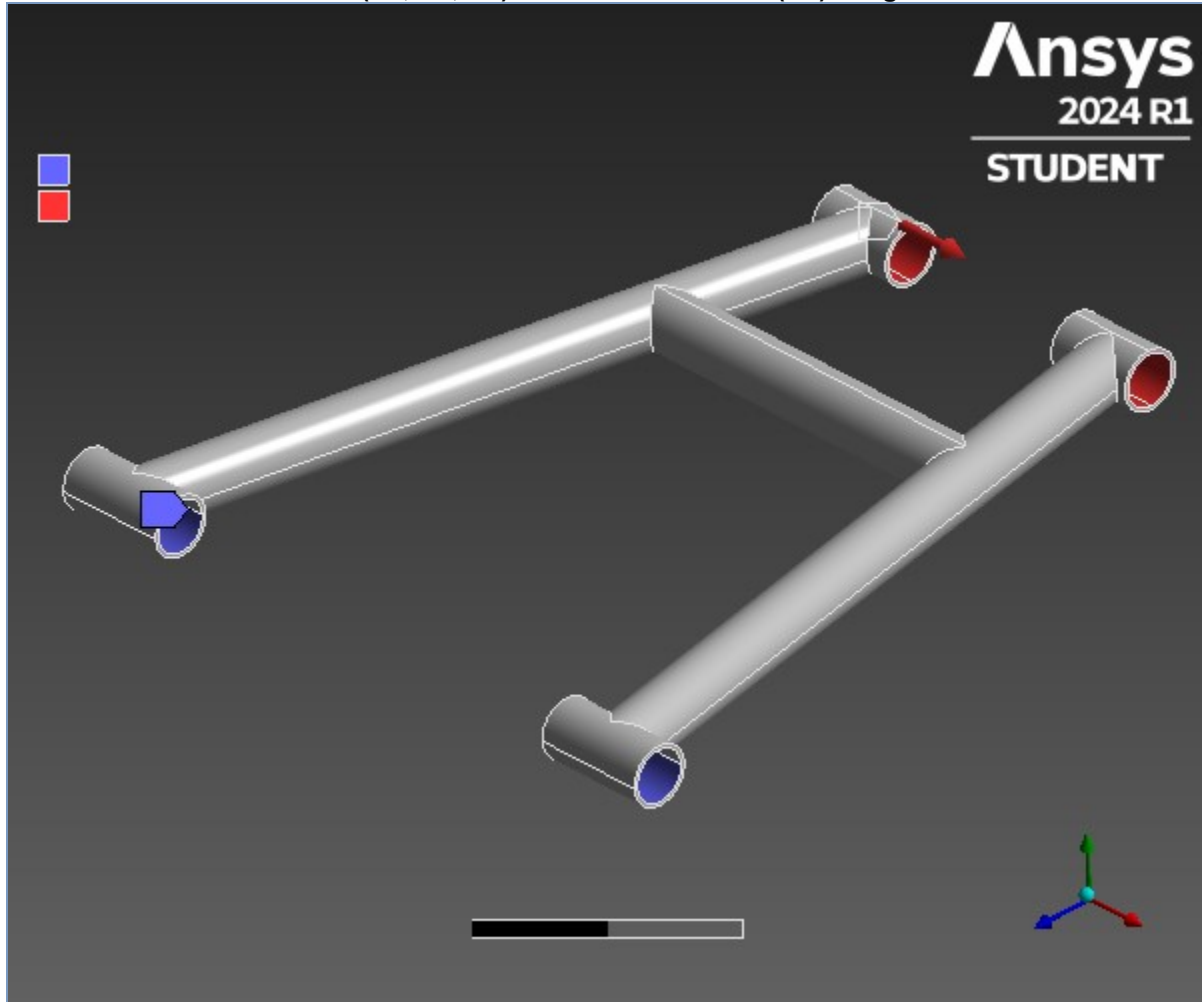


TABLE 46
Model (A4, B4, C4) > Static Structural 3 (B5) > Loads

Model (A1), B1, C1 - Static Structural (B2) - Loads		
Object Name	Fixed Support	Force
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	2 Faces	4 Faces
Definition		
Type	Fixed Support	Force
Suppressed	No	
Define By		Components
Applied By		Surface Effect
Coordinate System		Global Coordinate System
X Component		6700. N (ramped)
Y Component		0. N (ramped)
Z Component		0. N (ramped)

Solution (B6)

TABLE 47
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution

Object Name	<i>Solution (B6)</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	6. s
MAPDL Memory Used	568. MB
MAPDL Result File Size	12.25 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 48
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0
Update Interval	2.5 s
Display Points	All
FE Connection Visibility	
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 49
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Results

Object Name	Total Deformation	Equivalent Elastic Strain	Equivalent Stress
State	Solved		
Scope			
Scoping Method	Geometry Selection		
Geometry	All Bodies		
Definition			
Type	Total Deformation	Equivalent Elastic Strain	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	3.8726e-008 m/m	2079.6 Pa
Maximum	3.7357e-003 m	5.1771e-003 m/m	1.0266e+009 Pa
Average	1.5281e-003 m	8.4391e-004 m/m	1.5233e+008 Pa
Minimum Occurs On	Solid		

Maximum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	
Integration Point Results		
Display Option		Averaged
Average Across Bodies		No

FIGURE 32
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Total Deformation

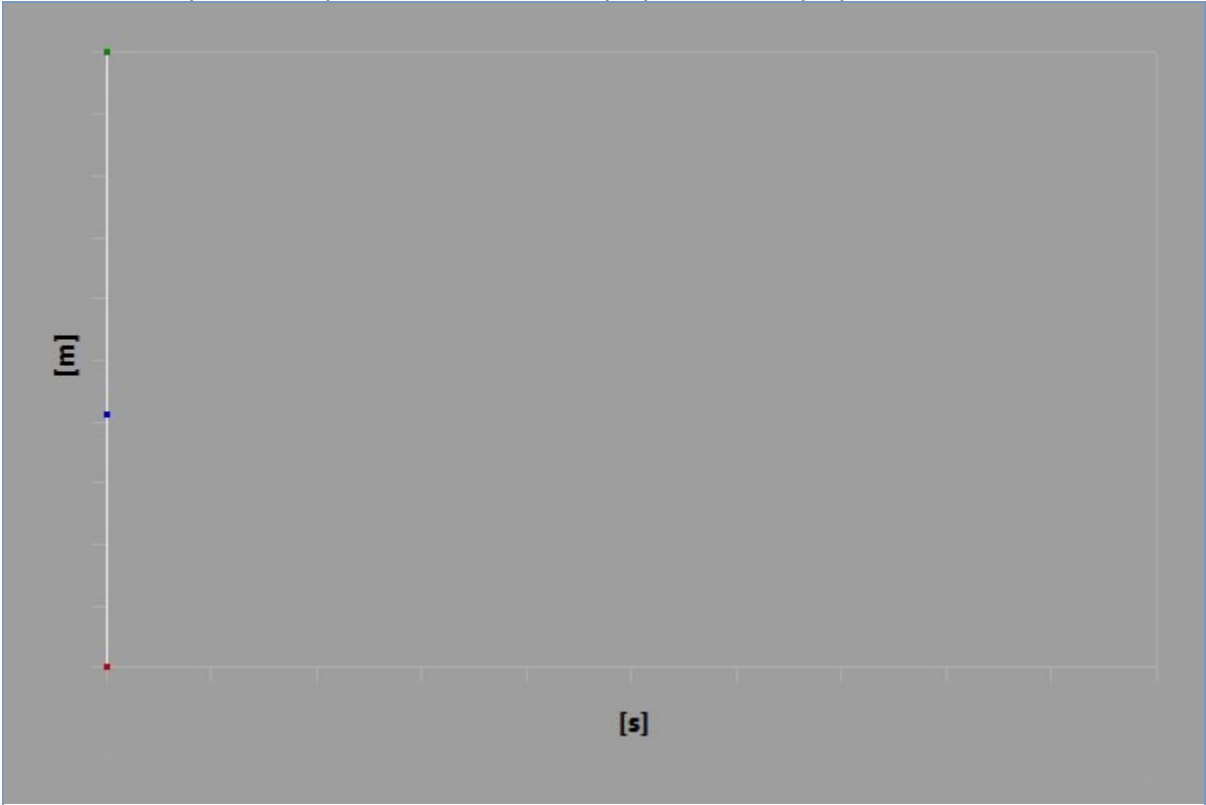


TABLE 50
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Total Deformation

Time [s]	Minimum [m]	Maximum [m]	Average [m]
1.	0.	3.7357e-003	1.5281e-003

FIGURE 33
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Total Deformation > Figure

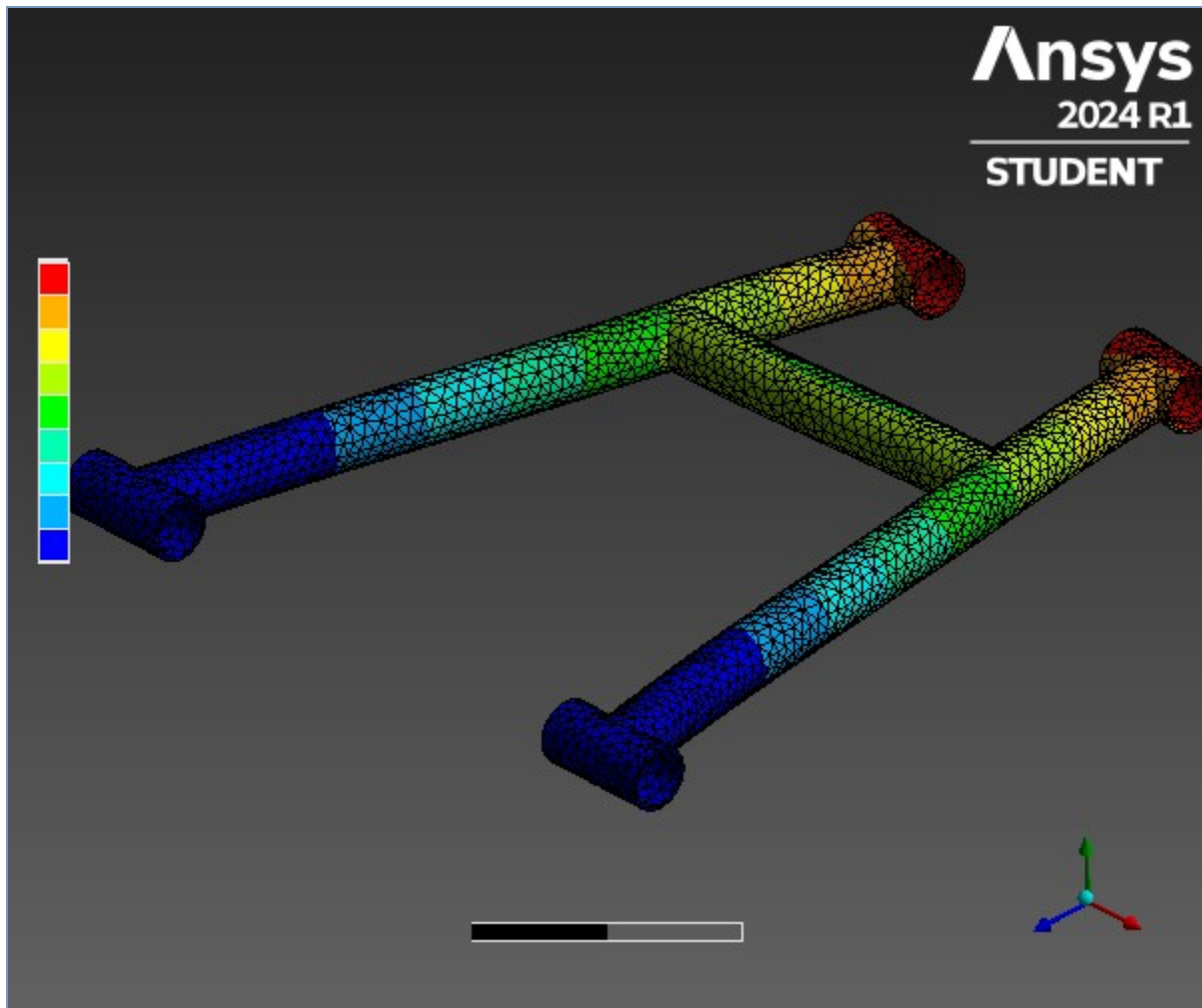
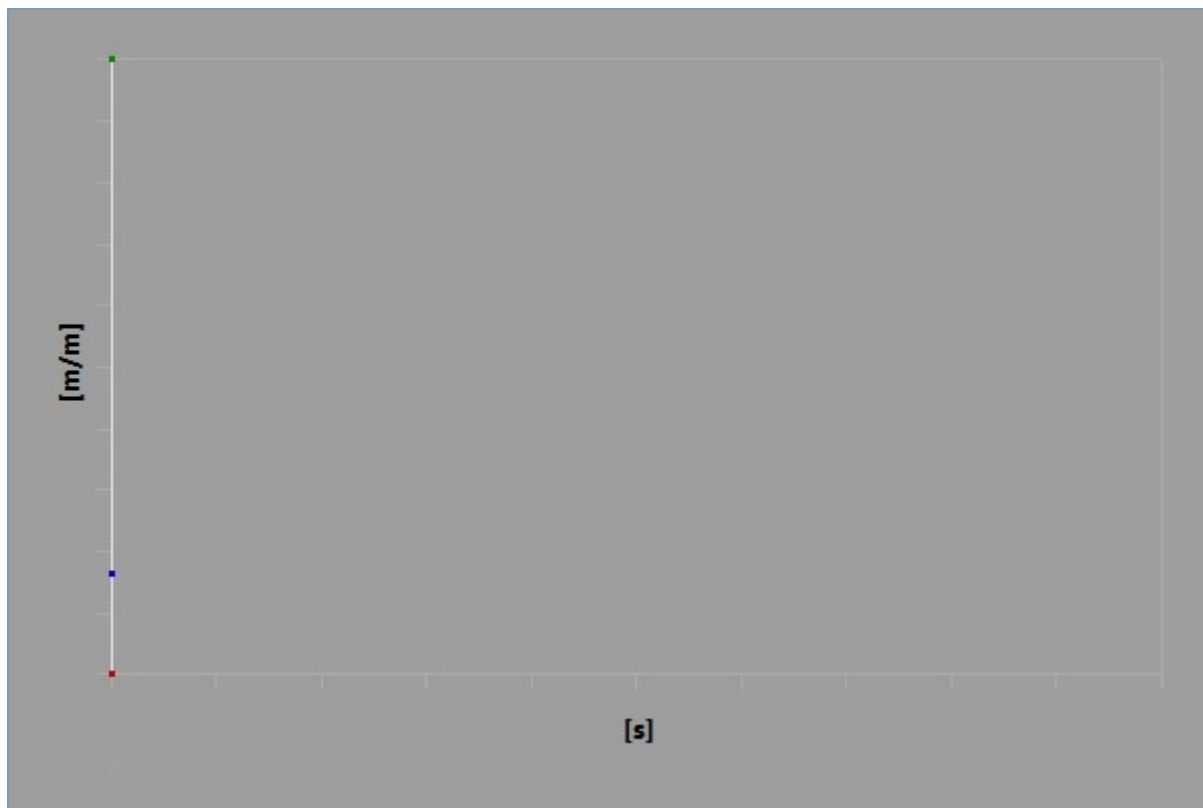


FIGURE 34
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Equivalent Elastic Strain

**TABLE 51****Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Equivalent Elastic Strain**

Time [s]	Minimum [m/m]	Maximum [m/m]	Average [m/m]
1.	3.8726e-008	5.1771e-003	8.4391e-004

FIGURE 35**Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Equivalent Elastic Strain > Figure**

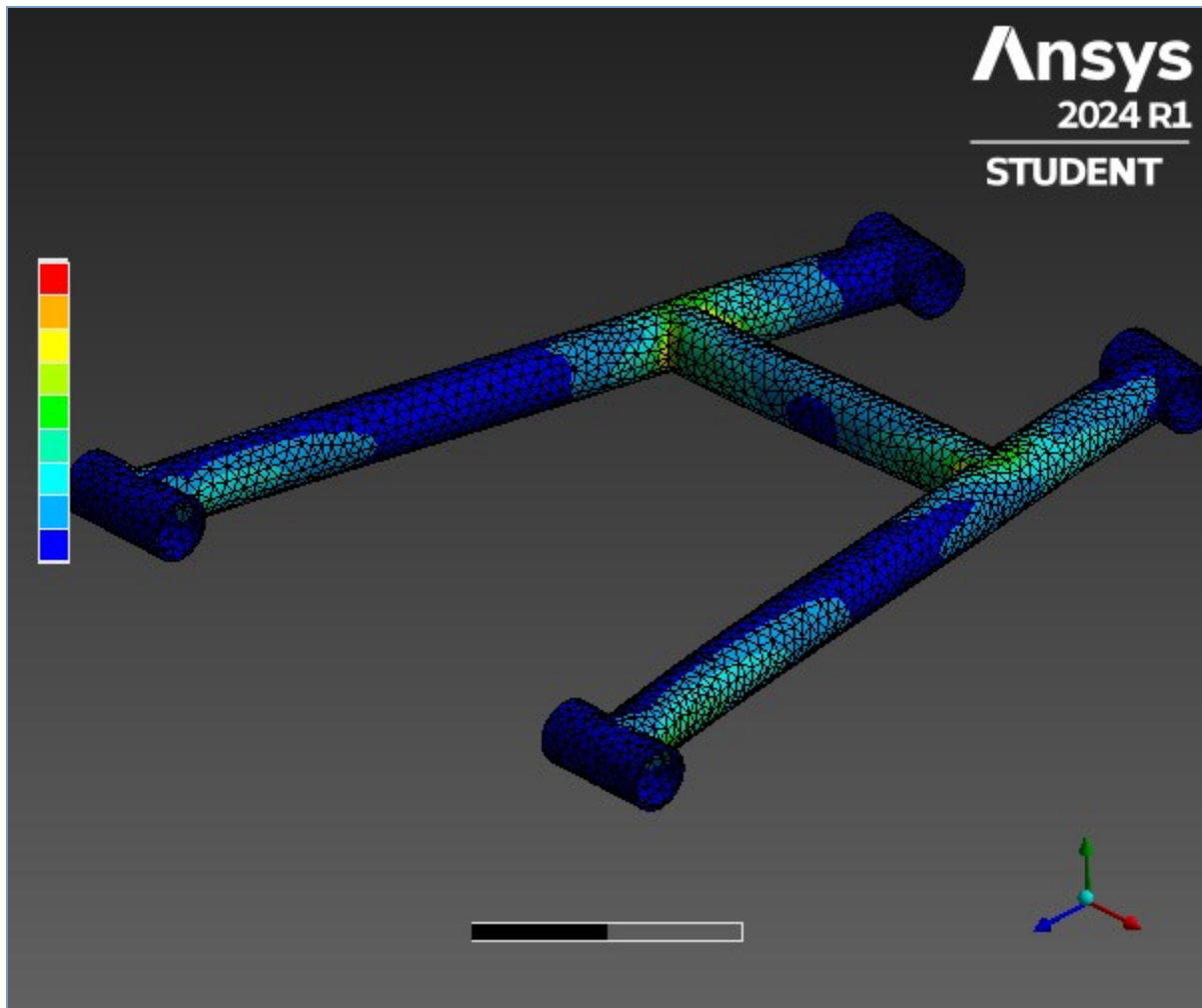
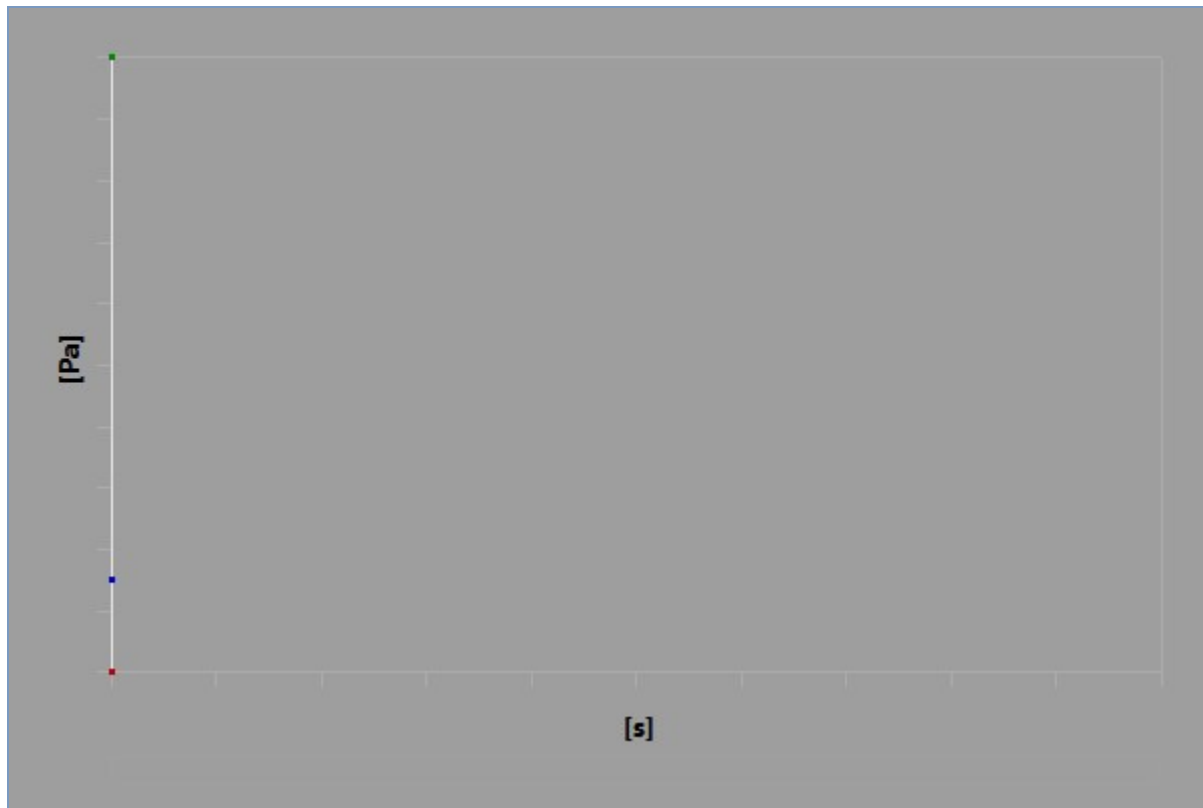


FIGURE 36
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Equivalent Stress

**TABLE 52****Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Equivalent Stress**

Time [s]	Minimum [Pa]	Maximum [Pa]	Average [Pa]
1.	2079.6	1.0266e+009	1.5233e+008

FIGURE 37**Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Equivalent Stress > Figure**

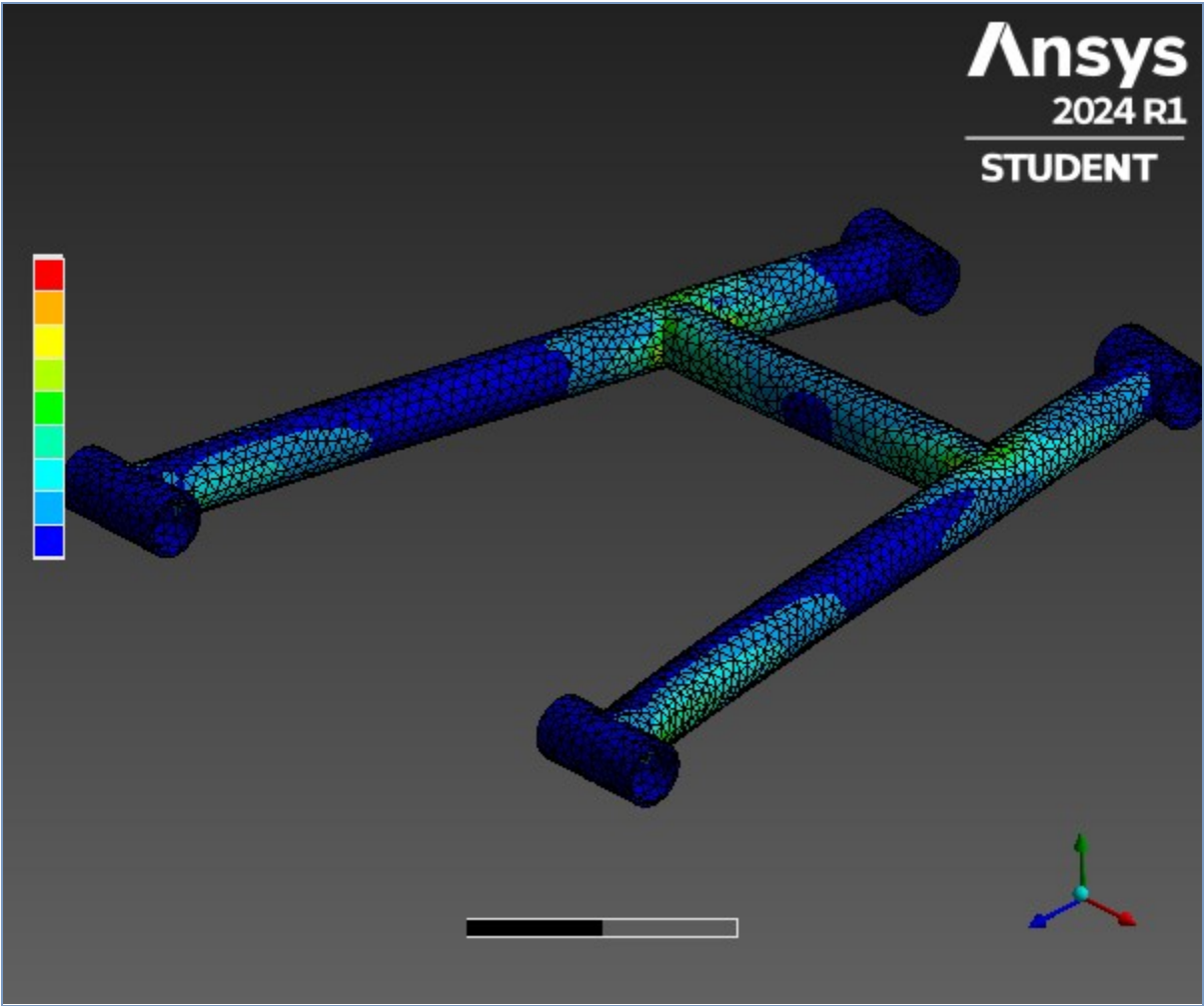


TABLE 53

Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Safety Tools

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

TABLE 54

Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool > Results

Object Name	Safety Factor	Safety Margin
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Safety Factor	Safety Margin
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	0.24351	-0.75649
Minimum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 38
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool > Safety Factor

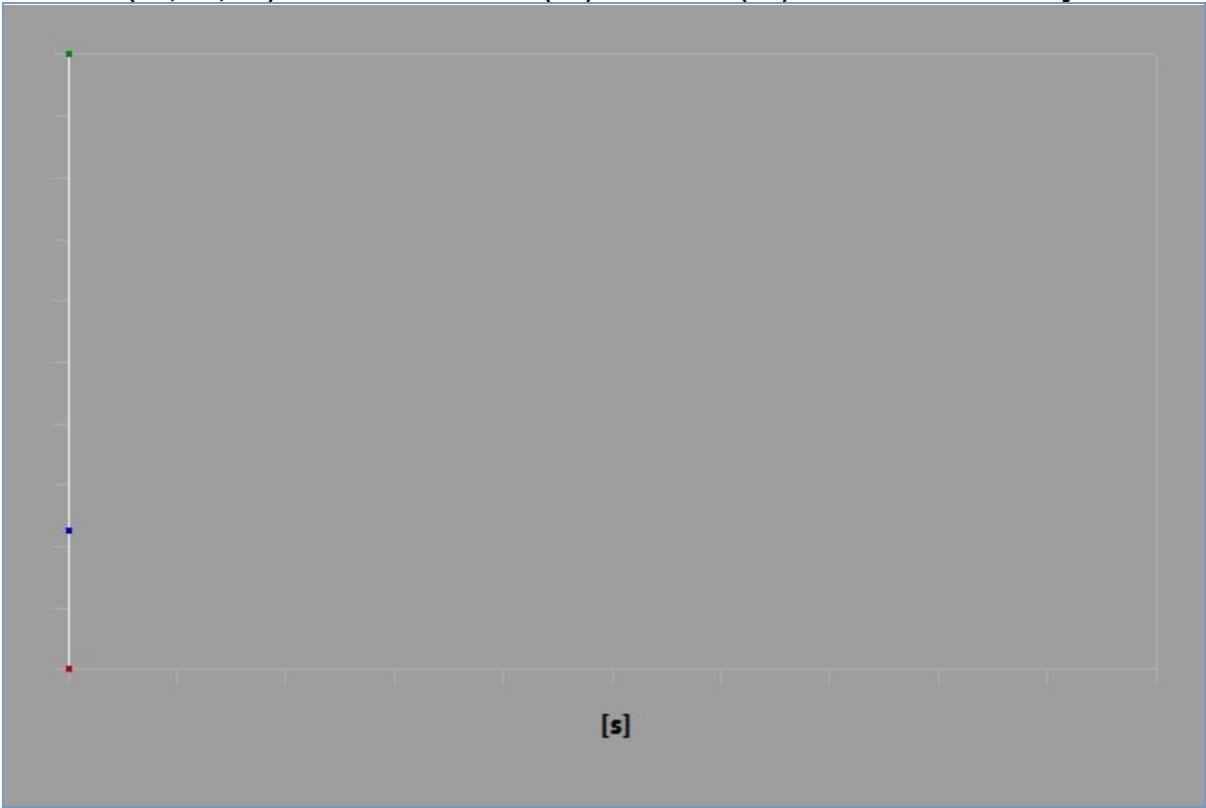


TABLE 55
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool > Safety Factor

Time [s]	Minimum	Maximum	Average
1.	0.24351	15.	3.5571

FIGURE 39
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool > Safety Factor > Figure

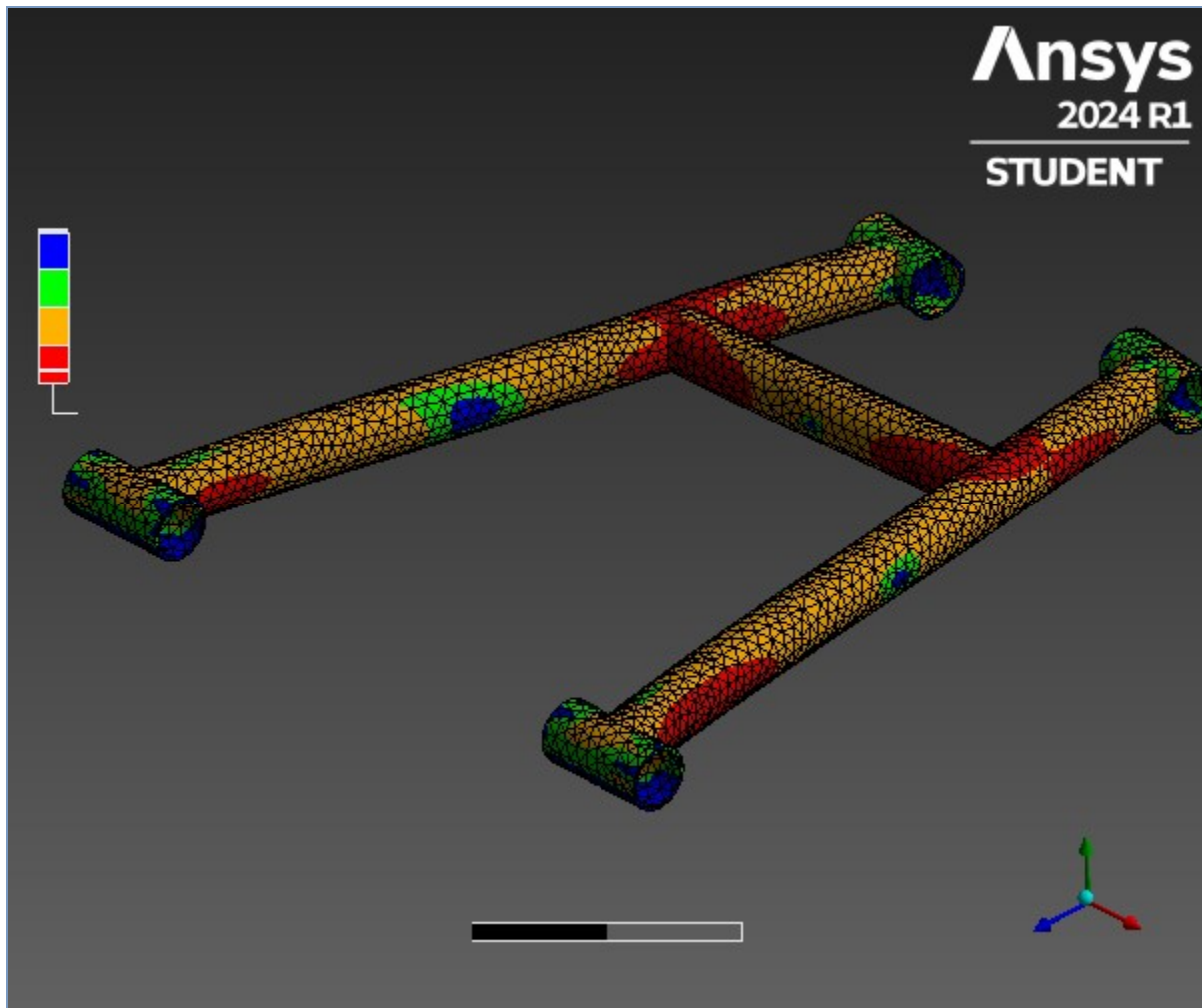
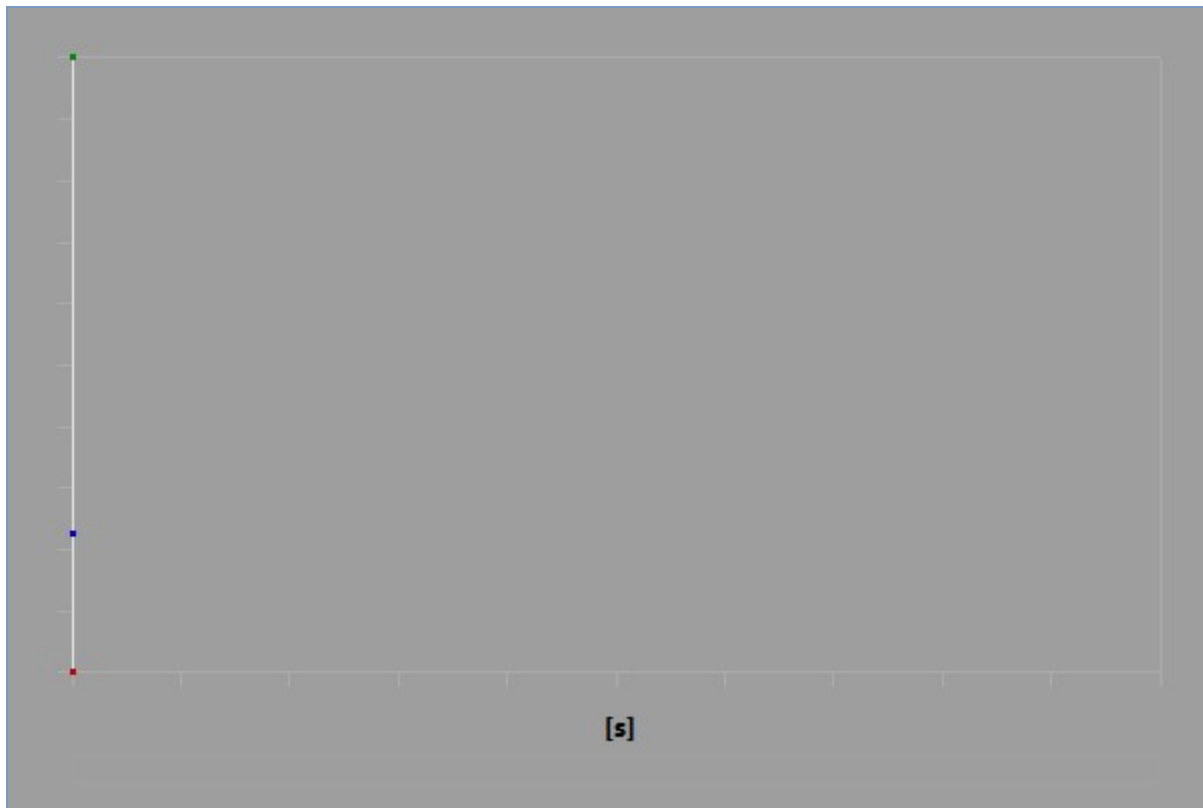


FIGURE 40
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool > Safety Margin

**TABLE 56****Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool > Safety Margin**

Time [s]	Minimum	Maximum	Average
1.	-0.75649	14.	2.5571

FIGURE 41**Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool > Safety Margin > Figure**

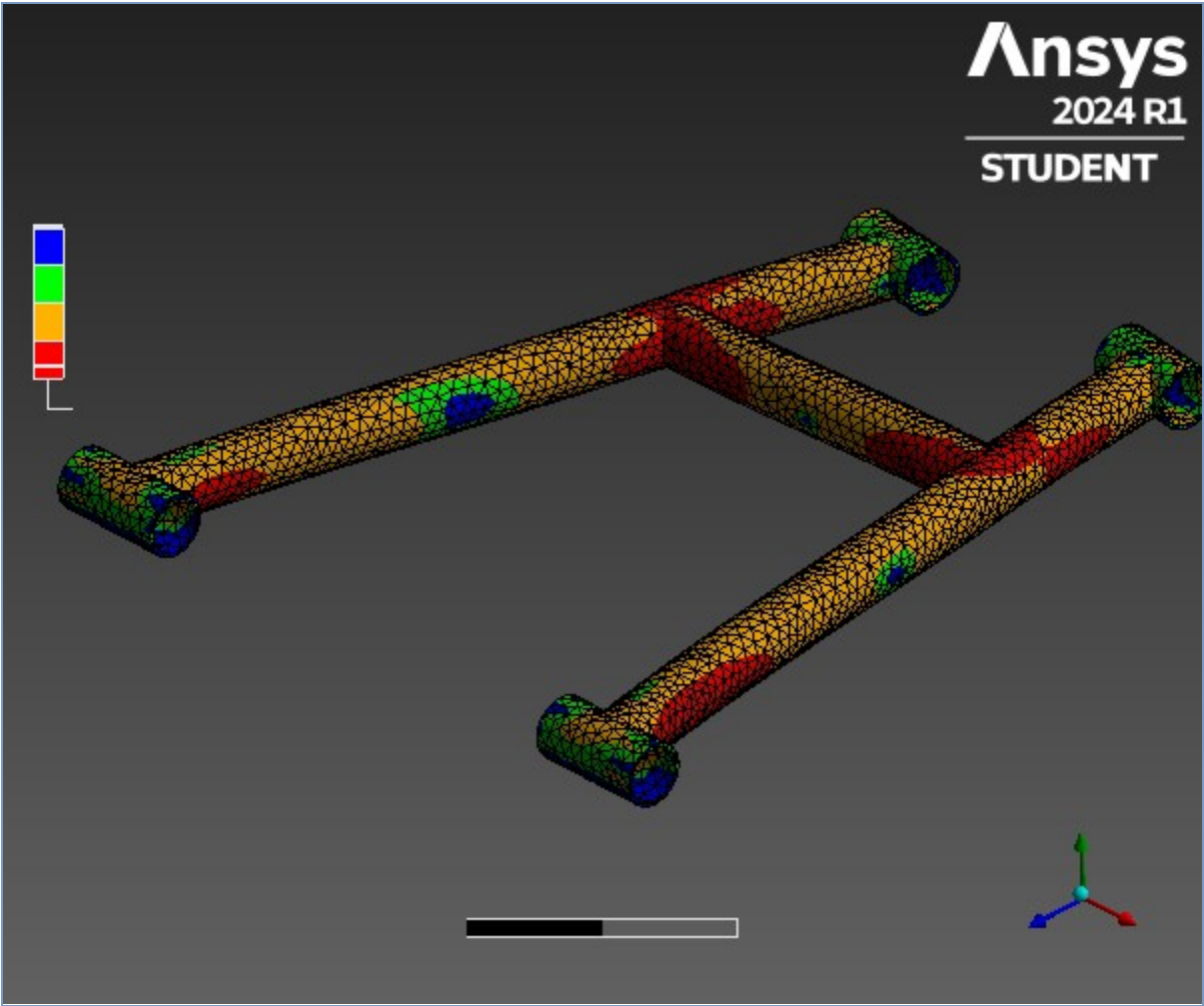


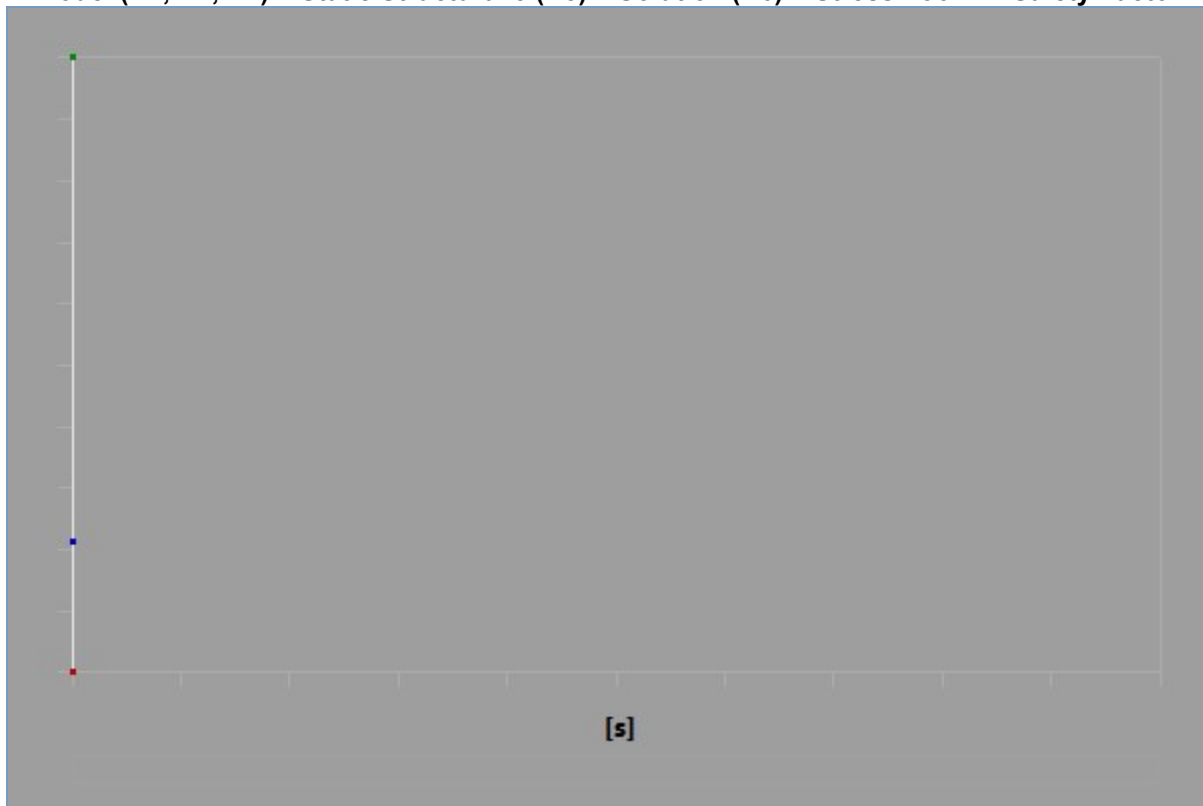
TABLE 57
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Safety Tools

Object Name	<i>Stress Tool 2</i>
State	Solved
Definition	
Theory	Max Shear Stress
Factor	0.5
Stress Limit Type	Tensile Yield Per Material

TABLE 58
Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool 2 > Results

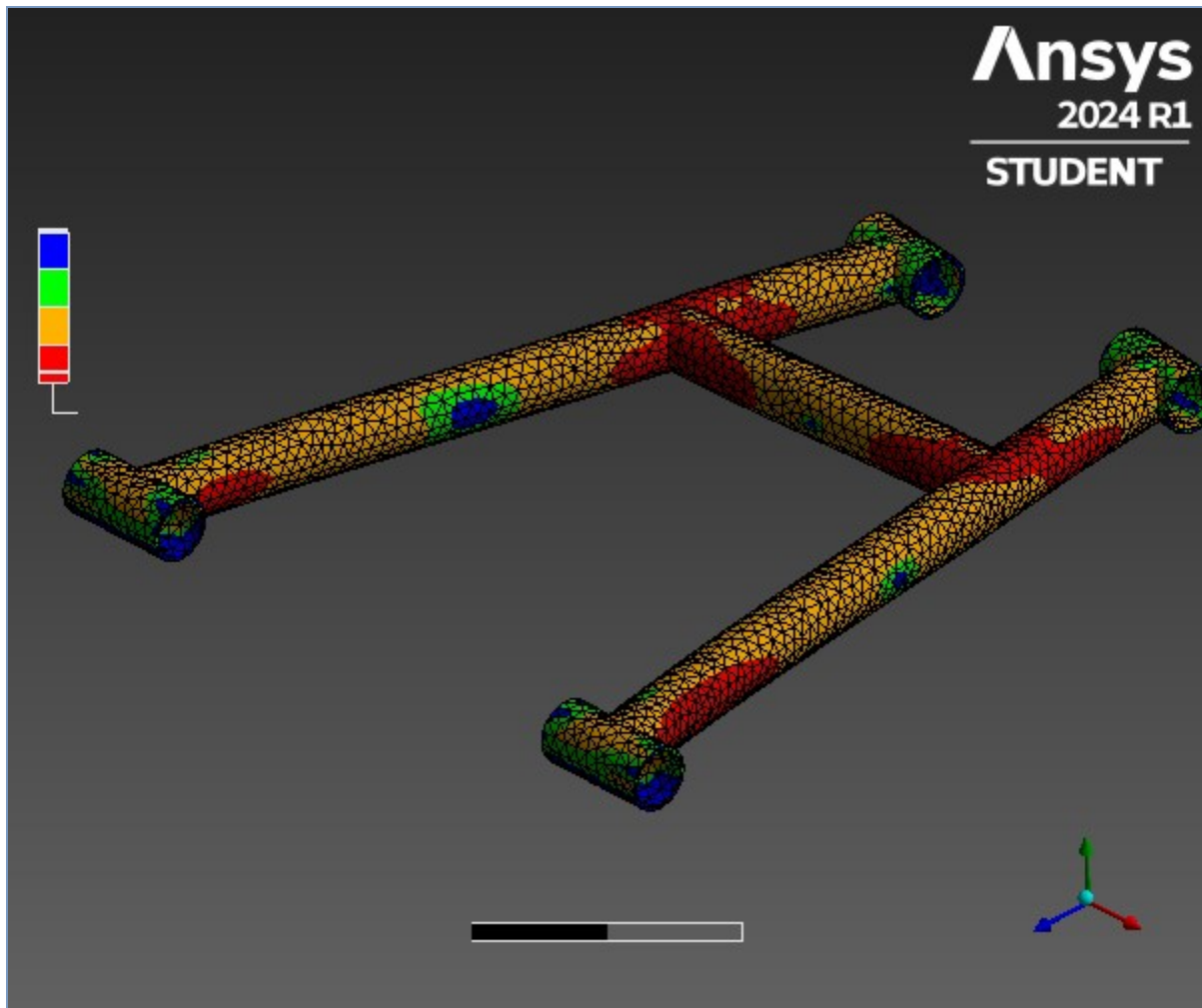
Object Name	Safety Factor	Safety Margin
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Safety Factor	Safety Margin
By	Time	
Display Time	Last	
Separate Data by Entity	No	
Calculate Time History	Yes	
Identifier		

Suppressed	No	
Integration Point Results		
Display Option	Averaged	
Average Across Bodies	No	
Results		
Minimum	0.21134	-0.78866
Minimum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 42**Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool 2 > Safety Factor****TABLE 59****Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool 2 > Safety Factor**

Time [s]	Minimum	Maximum	Average
1.	0.21134	15.	3.3252

FIGURE 43**Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool 2 > Safety Factor > Figure**

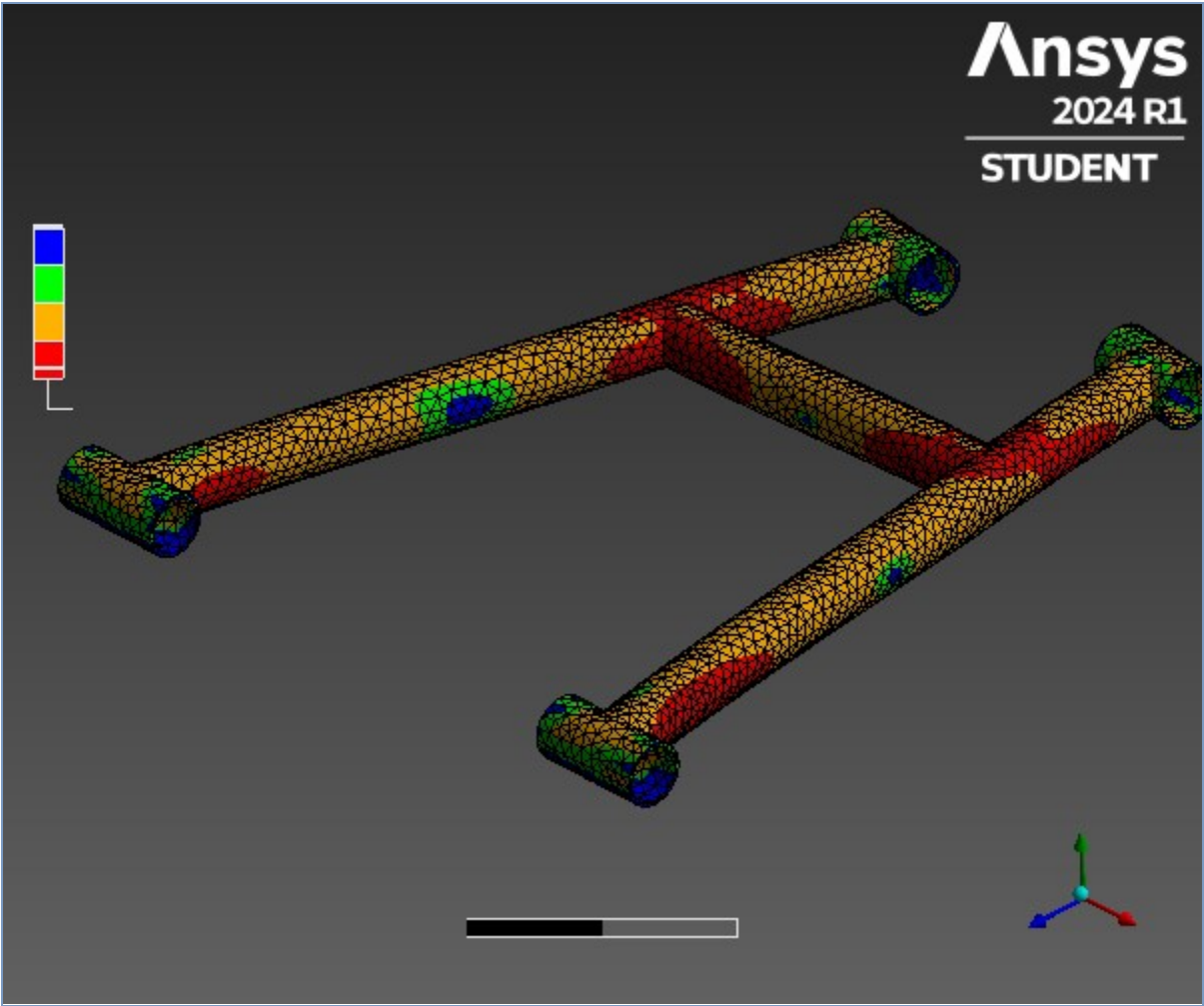
**FIGURE 44**

Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool 2 > Safety Margin

**TABLE 60****Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool 2 > Safety Margin**

Time [s]	Minimum	Maximum	Average
1.	-0.78866	14.	2.3252

FIGURE 45**Model (A4, B4, C4) > Static Structural 3 (B5) > Solution (B6) > Stress Tool 2 > Safety Margin > Figure**



Material Data

Structural Steel

TABLE 61
Structural Steel > Constants

Density	7850 kg m ⁻³
Coefficient of Thermal Expansion	1.2e-005 C ⁻¹
Specific Heat	434 J kg ⁻¹ C ⁻¹
Thermal Conductivity	60.5 W m ⁻¹ C ⁻¹
Resistivity	1.7e-007 ohm m

TABLE 62
Structural Steel > Color

Red	Green	Blue
132	139	179

TABLE 63
Structural Steel > Compressive Ultimate Strength

Compressive Ultimate Strength Pa
0

TABLE 64
Structural Steel > Compressive Yield Strength

Compressive Yield Strength Pa
2.5e+008

TABLE 65
Structural Steel > Tensile Yield Strength

Tensile Yield Strength Pa
2.5e+008

TABLE 66
Structural Steel > Tensile Ultimate Strength

Tensile Ultimate Strength Pa
4.6e+008

TABLE 67
Structural Steel > Isotropic Secant Coefficient of Thermal Expansion

Zero-Thermal-Strain Reference Temperature C
22

TABLE 68
Structural Steel > S-N Curve

Alternating Stress Pa	Cycles	Mean Stress Pa
3.999e+009	10	0
2.827e+009	20	0
1.896e+009	50	0
1.413e+009	100	0
1.069e+009	200	0
4.41e+008	2000	0
2.62e+008	10000	0
2.14e+008	20000	0
1.38e+008	1.e+005	0
1.14e+008	2.e+005	0
8.62e+007	1.e+006	0

TABLE 69
Structural Steel > Strain-Life Parameters

Strength Coefficient Pa	Strength Exponent	Ductility Coefficient	Ductility Exponent	Cyclic Strength Coefficient Pa	Cyclic Strain Hardening Exponent
9.2e+008	-0.106	0.213	-0.47	1.e+009	0.2

TABLE 70
Structural Steel > Isotropic Elasticity

Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa	Temperature C
2.e+011	0.3	1.6667e+011	7.6923e+010	

TABLE 71
Structural Steel > Isotropic Relative Permeability

Relative Permeability
10000