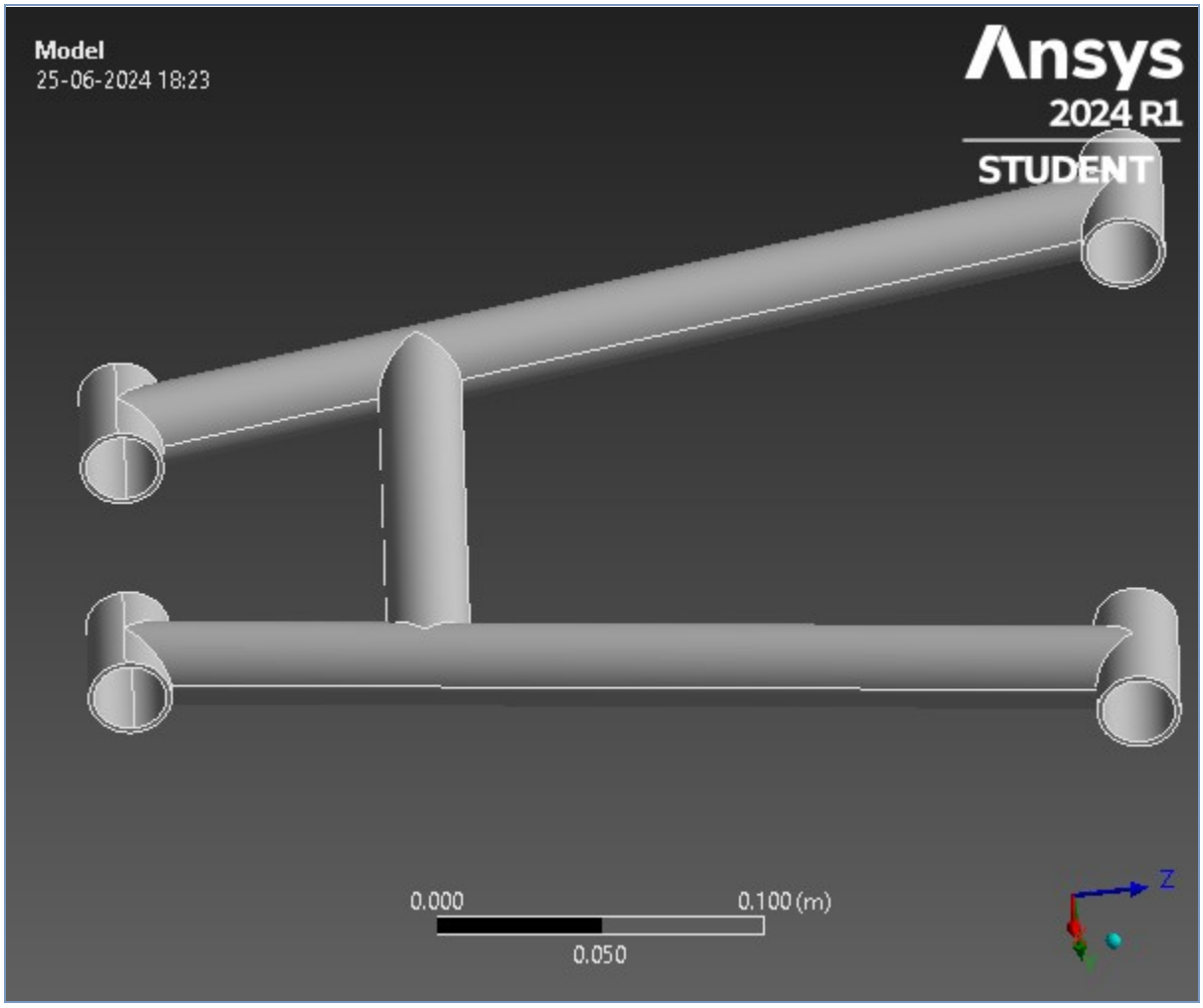
# Project*

| | |
|---|---|
| First Saved | Saturday, June 22, 2024 |
| Last Saved | Tuesday, June 25, 2024 |
| Product Version | 2024 R1 |
| Save Project Before Solution | No |
| Save Project After Solution | No |



# Contents



# 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**

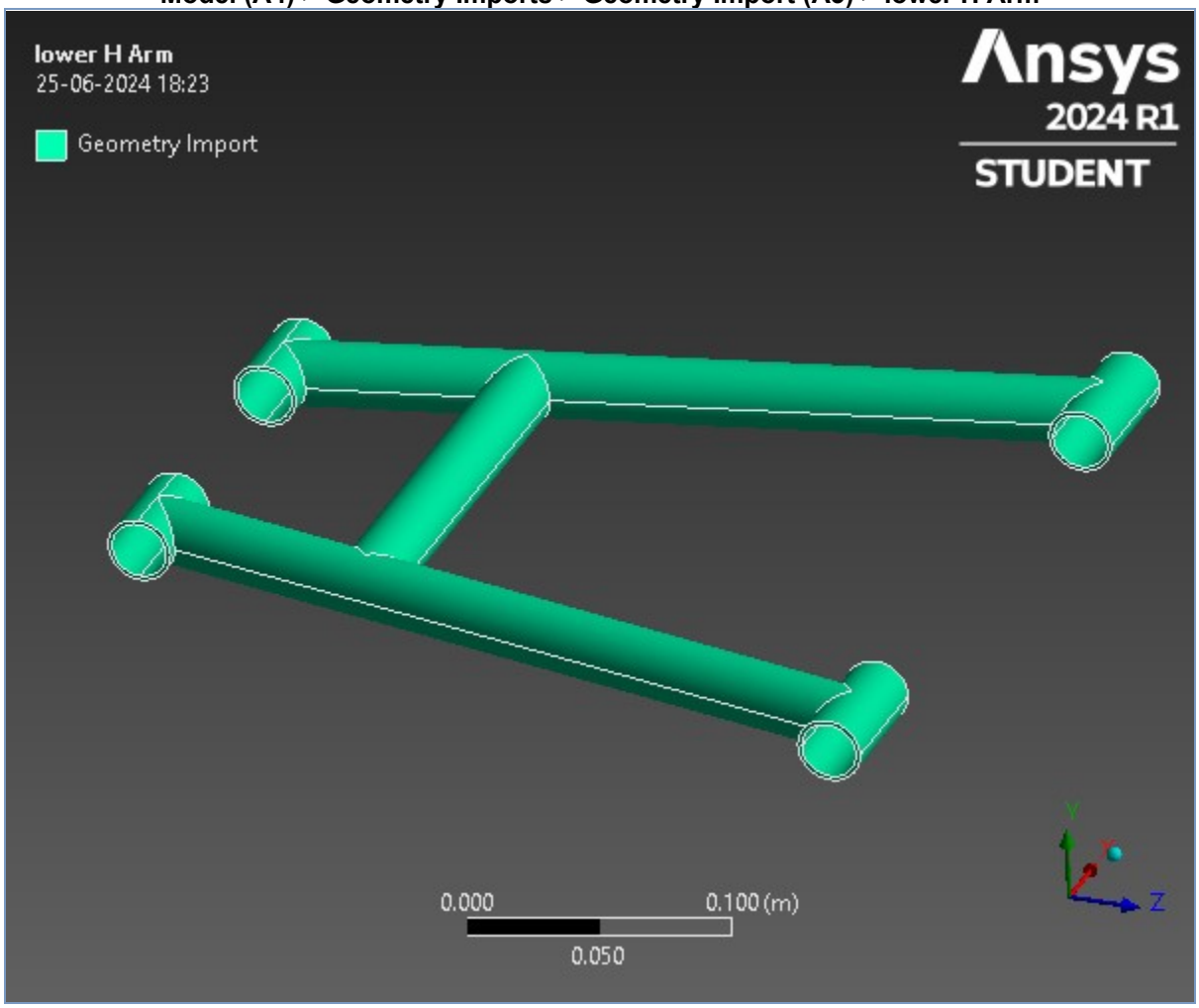
| | |
|---|---|
| Object Name | *Geometry Imports* |
| State | Solved |

**TABLE 3**
**Model (A4) > Geometry Imports > Geometry Import (A3)**

| | |
|---|---|
| Object Name | *Geometry Import (A3)* |
| State | Solved |
| **Definition** | |

| | |
|---|---|
| Source | C:\Users\91982\Desktop\Moksha\eBAJA 2024\Suspension Lower H Arm Analysis\suspension lower h arm_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 |

**FIGURE 1**
**Model (A4) > Geometry Imports > Geometry Import (A3) > lower H Arm**




## *Geometry*

**TABLE 4**
**Model (A4) > Geometry**

| | |
|---|---|
| Object Name | *Geometry* |
| State | Fully Defined |
| **Definition** | |
| Source | C:\Users\91982\Desktop\Moksha\eBAJA 2024\Suspension Lower H Arm Analysis\suspension lower h arm_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 | 0.33463 m |
| **Properties** | |
| Volume | 1.1396e-004 m³ |
| Mass | 0.89457 kg |
| Scale Factor Value | 1. |
| **Statistics** | |
| Bodies | 1 |
| Active Bodies | 1 |
| Nodes | 15270 |
| Elements | 7585 |
| 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) > Geometry > Parts**

| | |
|---|---|
| Object Name | *Solid* |
| 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 | Chromoly |
| Nonlinear Effects | Yes |
| Thermal Strain Effects | Yes |
| **Bounding Box** | |
| Length X | 0.31 m |
| Length Y | 2.54e-002 m |
| Length Z | 0.33463 m |
| **Properties** | |
| Volume | 1.1396e-004 m³ |
| Mass | 0.89457 kg |
| Centroid X | 0.28409 m |
| Centroid Y | -4.909e-006 m |
| Centroid Z | -0.16135 m |
| Moment of Inertia Ip1 | 8.7715e-003 kg·m² |
| Moment of Inertia Ip2 | 1.6603e-002 kg·m² |
| Moment of Inertia Ip3 | 7.9575e-003 kg·m² |
| **Statistics** | |
| Nodes | 15270 |
| Elements | 7585 |
| Mesh Metric | None |

**TABLE 6**
**Model (A4) > Materials**

| | |
|---|---|
| Object Name | *Materials* |
| State | Fully Defined |
| **Statistics** | |
| Materials | 2 |
| Material Assignments | 0 |

## *Coordinate Systems*

**TABLE 7**
**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 |

## *Mesh*

**TABLE 8**
**Model (A4) > Mesh**

| | |
|---|---|
| Object Name | *Mesh* |
| 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 | 0.45686 m |
| Average Surface Area | 2.8708e-003 m² |
| Minimum Edge Length | 9.353e-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 | 15270 |
| Elements | 7585 |
| Show Detailed Statistics | No |

**TABLE 9**
**Model (A4) > Mesh > Mesh Controls**

| Object Name | *Face Sizing* | *Automatic Method* |
|---|---|---|
| State | Fully Defined | |
| **Scope** | | |
| Scoping Method | Named Selection | Geometry Selection |
| Named Selection | Full Body | |
| Geometry | | 1 Body |
| **Definition** | | |
| Suppressed | No | |
| Type | Element Size | |
| Element Size | 8.e-003 m | |
| Method | | Automatic |
| Element Order | | Use Global Setting |
| **Advanced** | | |
| Defeature Size | Default | |
| Influence Volume | No | |
| Behavior | Soft | |

### *Named Selections*

**TABLE 10**
**Model (A4) > Named Selections > Named Selections**

| Object Name | *Full Body* |
|---|---|
| State | Fully Defined |
| **Scope** | |
| Scoping Method | Geometry Selection |
| Geometry | 48 Faces |
| **Definition** | |
| Send to Solver | Yes |
| Protected | Program Controlled |
| Visible | Yes |
| Program Controlled Inflation | Exclude |
| **Statistics** | |
| Type | Manual |
| Total Selection | 48 Faces |
| Surface Area | 0.1378 m² |
| Suppressed | 0 |
| Used by Mesh Worksheet | No |

## Static Structural (A5)

**TABLE 11**
**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 12**
**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** | |
| 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\Desktop\Moksha\eBAJA 2024\Suspension Lower H Arm Analysis\suspension lower h arm_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) > Figure**

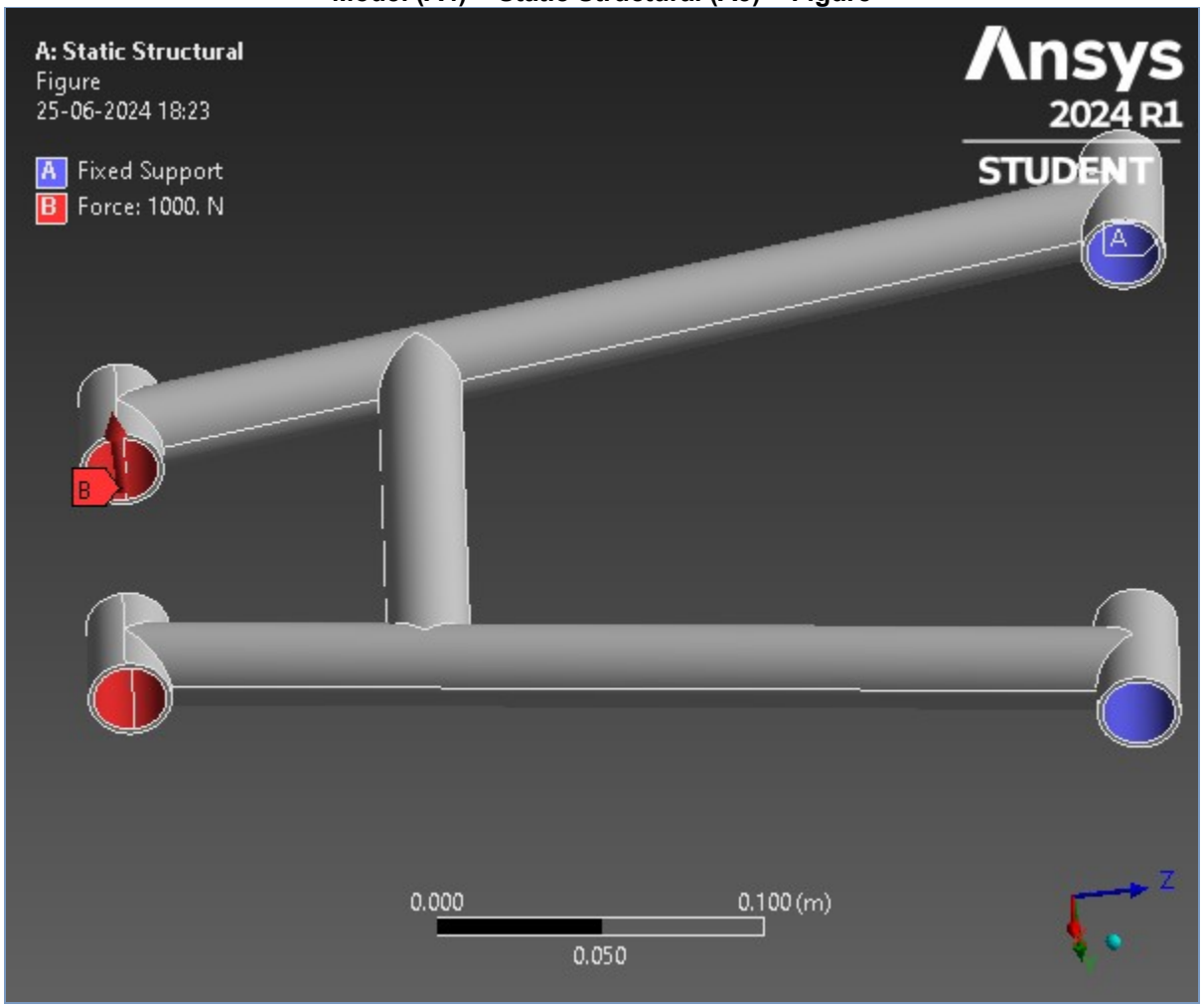
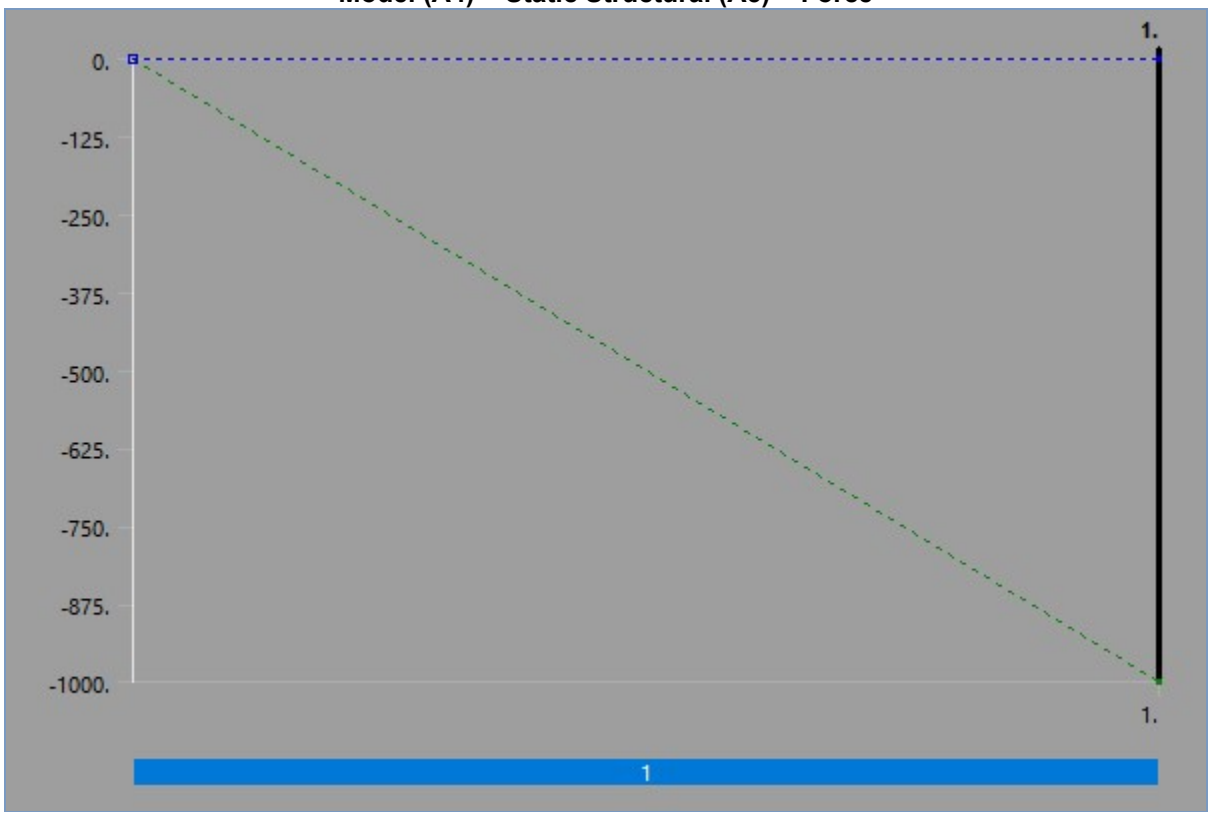



**TABLE 13**
**Model (A4) > Static Structural (A5) > Loads**

| 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 | | -1000. N (ramped) |
| Z Component | | 0. N (ramped) |

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




## *Solution (A6)*

**TABLE 14**
**Model (A4) > Static Structural (A5) > Solution**

| | |
|---|---|
| Object Name | *Solution (A6)* |
| State | Solved |
| **Adaptive Mesh Refinement** | |
| Max Refinement Loops | 1. |
| Refinement Depth | 2. |
| **Information** | |
| Status | Done |
| MAPDL Elapsed Time | 4. s |

| | |
|---|---|
| MAPDL Memory Used | 326. MB |
| MAPDL Result File Size | 5.125 MB |
| **Post Processing** | |
| Beam Section Results | No |
| On Demand Stress/Strain | No |

**TABLE 15**
**Model (A4) > Static Structural (A5) > Solution (A6) > Solution Information**

| Object Name | *Solution Information* |
|---|---|
| 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 16**
**Model (A4) > Static Structural (A5) > Solution (A6) > Results**

| Object Name | *Equivalent Stress* | *Total Deformation* | *X Directional Deformation* | *Y Directional Deformation* | *Z Directional Deformation* |
|---|---|---|---|---|---|
| State | Solved | | | | |
| **Scope** | | | | | |
| Scoping Method | Geometry Selection | | | | |
| Geometry | All Bodies | | | | |
| **Definition** | | | | | |
| Type | Equivalent (von-Mises) Stress | Total Deformation | Directional Deformation | | |
| By | Time | | | | |
| Display Time | Last | | | | |
| Separate Data by Entity | No | | | | |
| Calculate Time History | Yes | | | | |
| Identifier | | | | | |
| Suppressed | No | | | | |
| Orientation | | | X Axis | Y Axis | Z Axis |
| Coordinate System | | | Global Coordinate System | | |
| **Integration Point Results** | | | | | |
| Display Option | Averaged | | | | |
| Average Across Bodies | No | | | | |
| **Results** | | | | | |
| Minimum | 58704 Pa | 0. m | -1.3008e-005 m | -3.3698e-003 m | -1.7566e-004 m |
| | | | | | |

| | | | | | |
|---|---|---|---|---|---|
| Maximum | 2.6224e+008 Pa | 3.3698e-003 m | 1.3811e-005 m | 1.1626e-005 m | 1.9832e-004 m |
| Average | 5.0257e+007 Pa | 1.357e-003 m | 5.4489e-007 m | -1.3522e-003 m | 1.1657e-005 m |
| Minimum Occurs On | Solid | | | | |
| Maximum Occurs On | Solid | | | | |
| **Information** | | | | | |
| Time | 1. s | | | | |
| Load Step | 1 | | | | |
| Substep | 1 | | | | |
| Iteration Number | 1 | | | | |

**FIGURE 4**
**Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress**

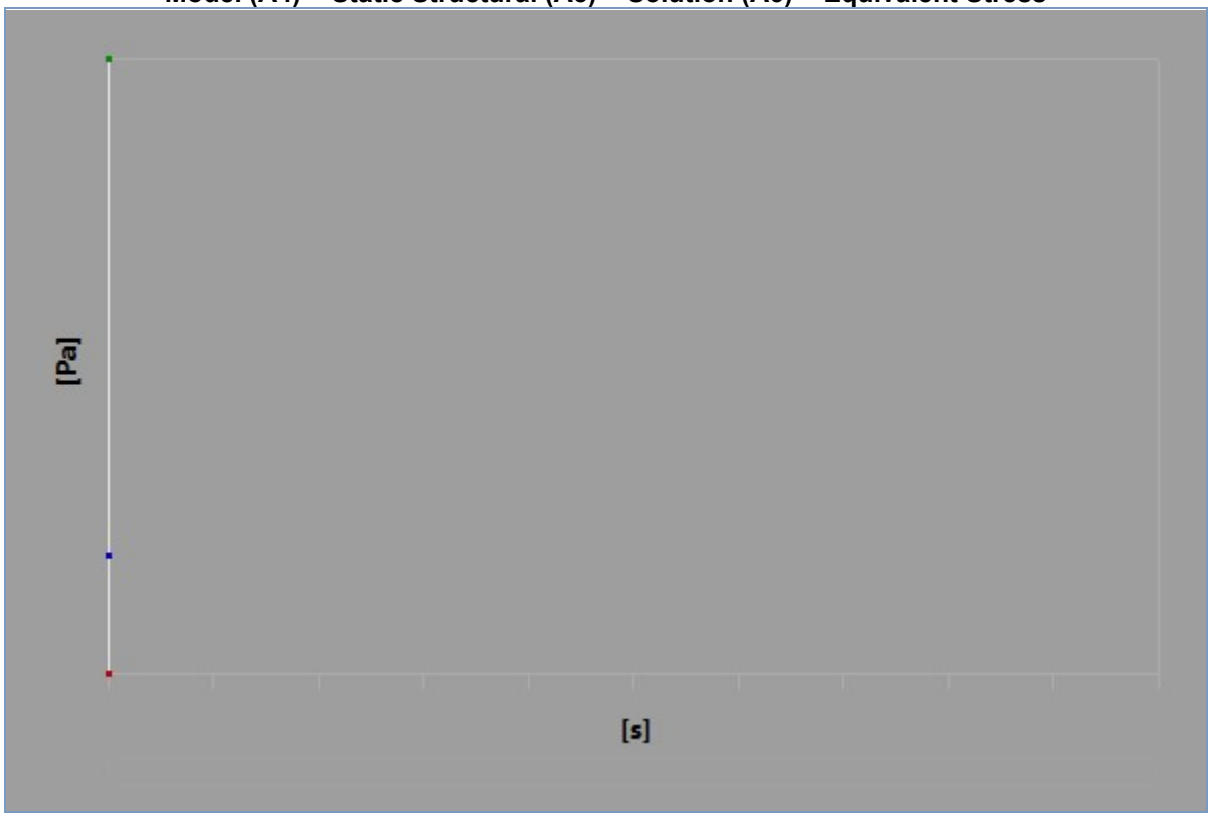



**TABLE 17**
**Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress**

| Time [s] | Minimum [Pa] | Maximum [Pa] | Average [Pa] |
|---|---|---|---|
| 1. | 58704 | 2.6224e+008 | 5.0257e+007 |

**FIGURE 5**
**Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress > Equivalent Stress**

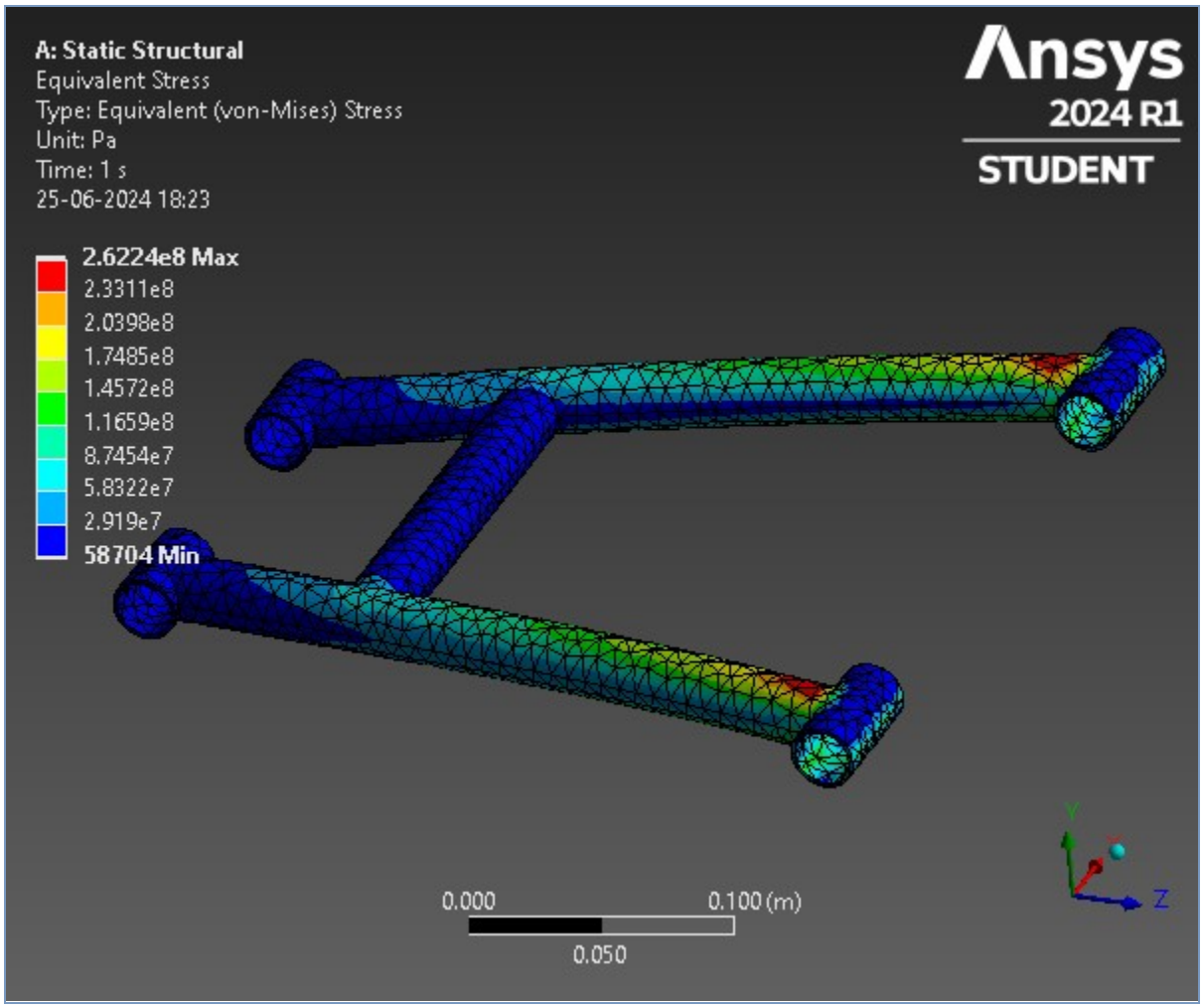



**FIGURE 6**
**Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation**

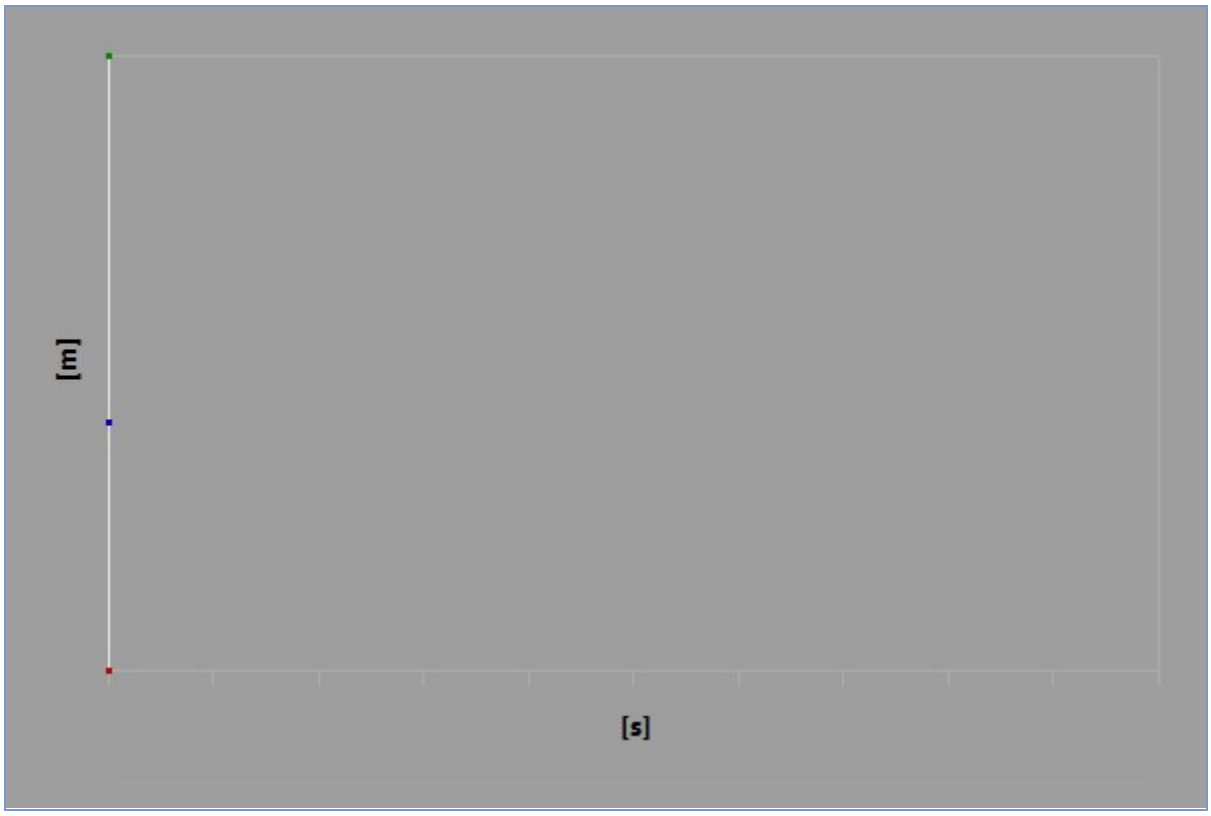



**TABLE 18**
**Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation**

| Time [s] | Minimum [m] | Maximum [m] | Average [m] |
|---|---|---|---|
| 1. | 0. | 3.3698e-003 | 1.357e-003 |

**FIGURE 7**
**Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation > Total Deformation**

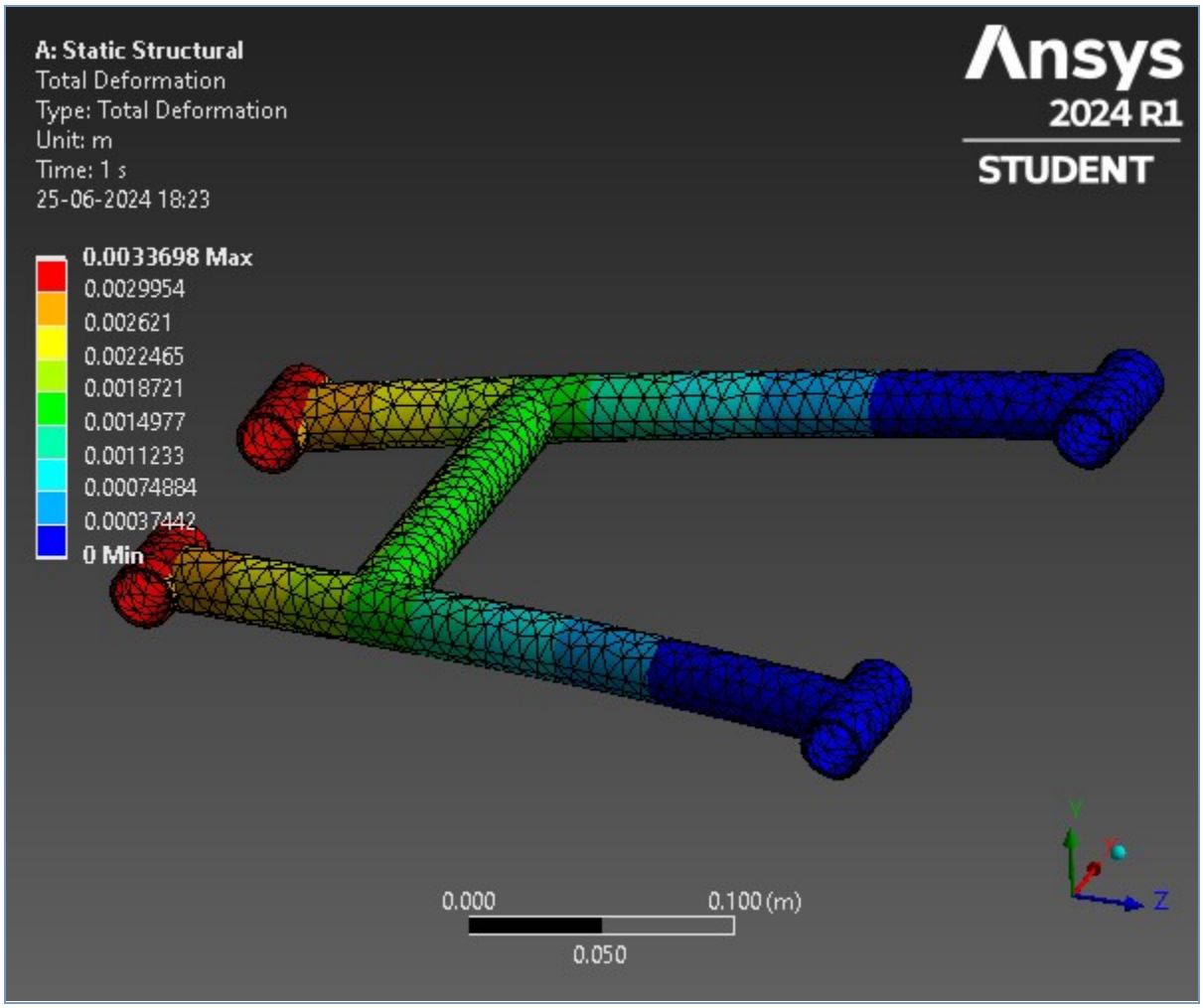



**FIGURE 8**
**Model (A4) > Static Structural (A5) > Solution (A6) > X Directional Deformation**

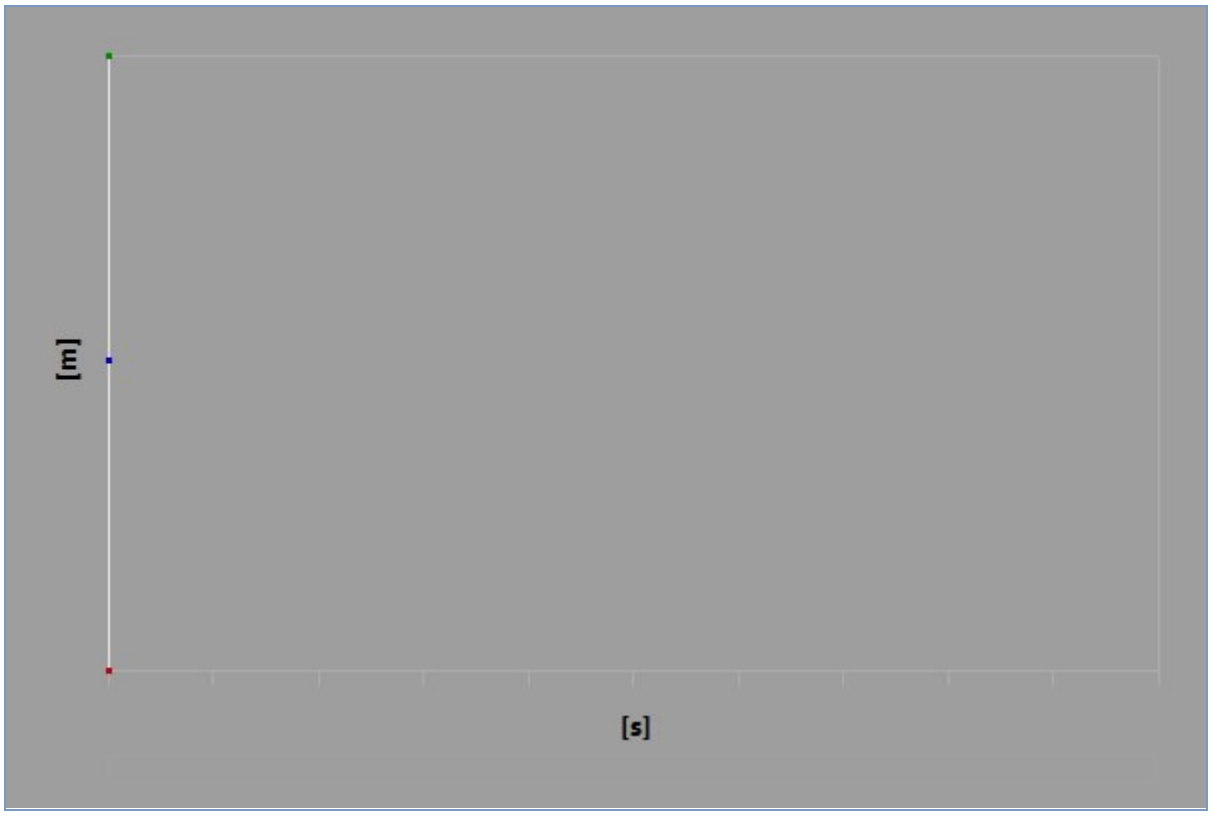



**TABLE 19**
**Model (A4) > Static Structural (A5) > Solution (A6) > X Directional Deformation**

| Time [s] | Minimum [m] | Maximum [m] | Average [m] |
|---|---|---|---|
| 1. | -1.3008e-005 | 1.3811e-005 | 5.4489e-007 |

**FIGURE 9**
**Model (A4) > Static Structural (A5) > Solution (A6) > X Directional Deformation > Figure**

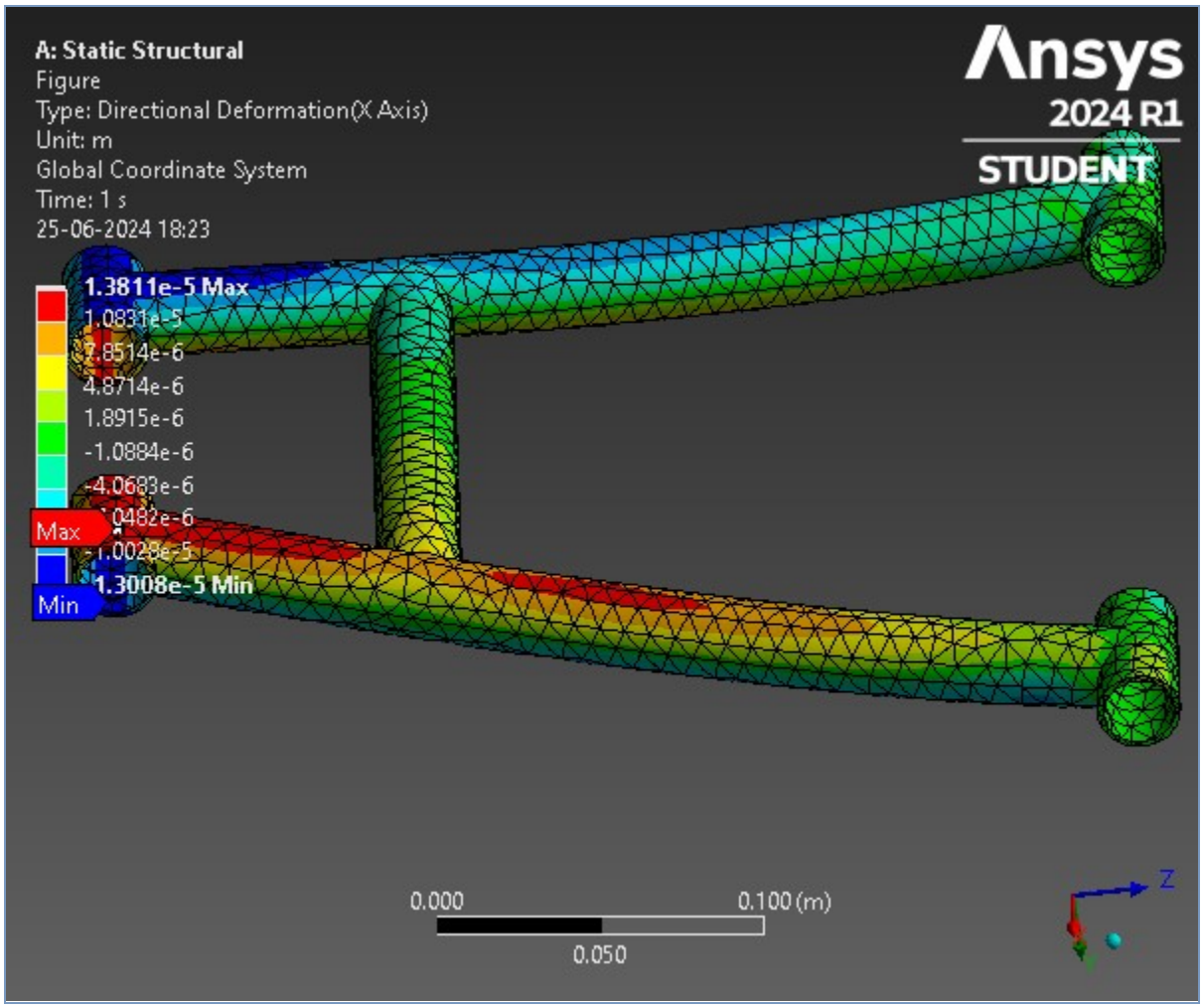



**FIGURE 10**
**Model (A4) > Static Structural (A5) > Solution (A6) > Y Directional Deformation**

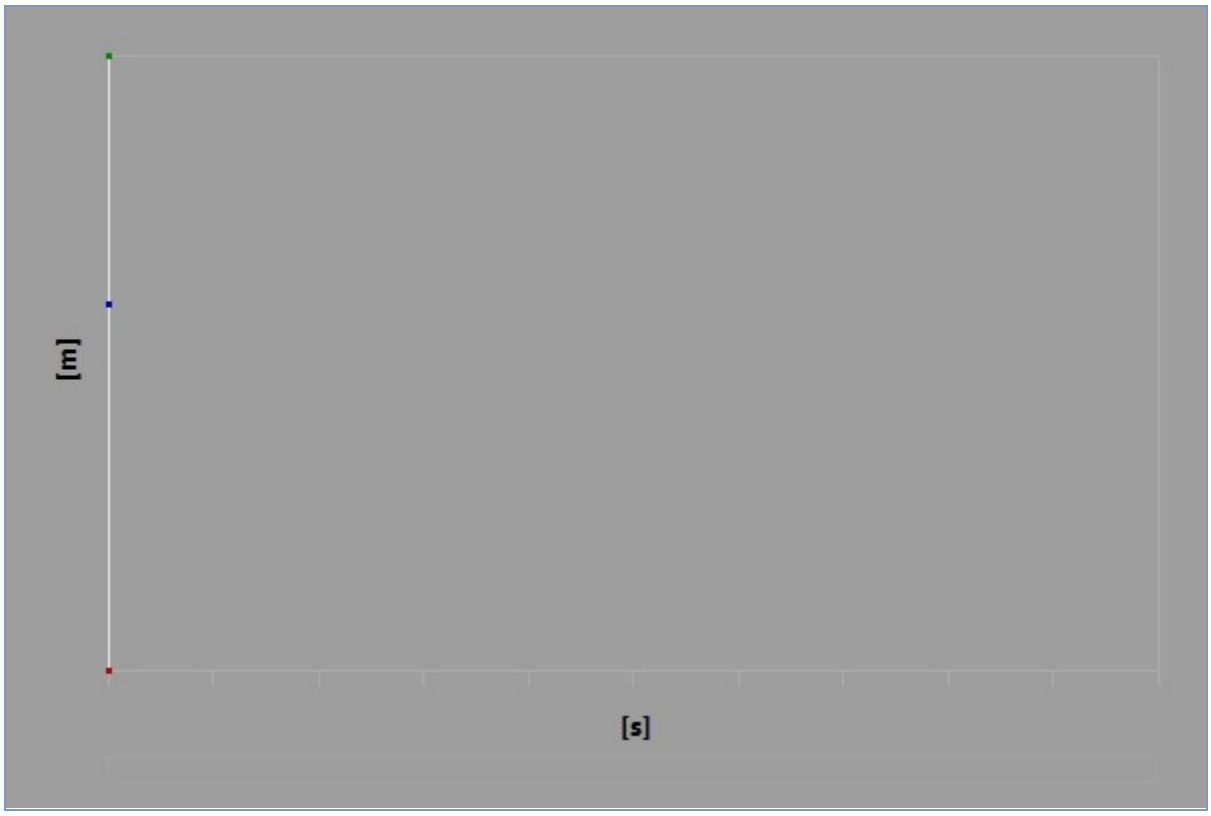



**TABLE 20**
**Model (A4) > Static Structural (A5) > Solution (A6) > Y Directional Deformation**

| Time [s] | Minimum [m] | Maximum [m] | Average [m] |
|---|---|---|---|
| 1. | -3.3698e-003 | 1.1626e-005 | -1.3522e-003 |

**FIGURE 11**
**Model (A4) > Static Structural (A5) > Solution (A6) > Y Directional Deformation > Figure**

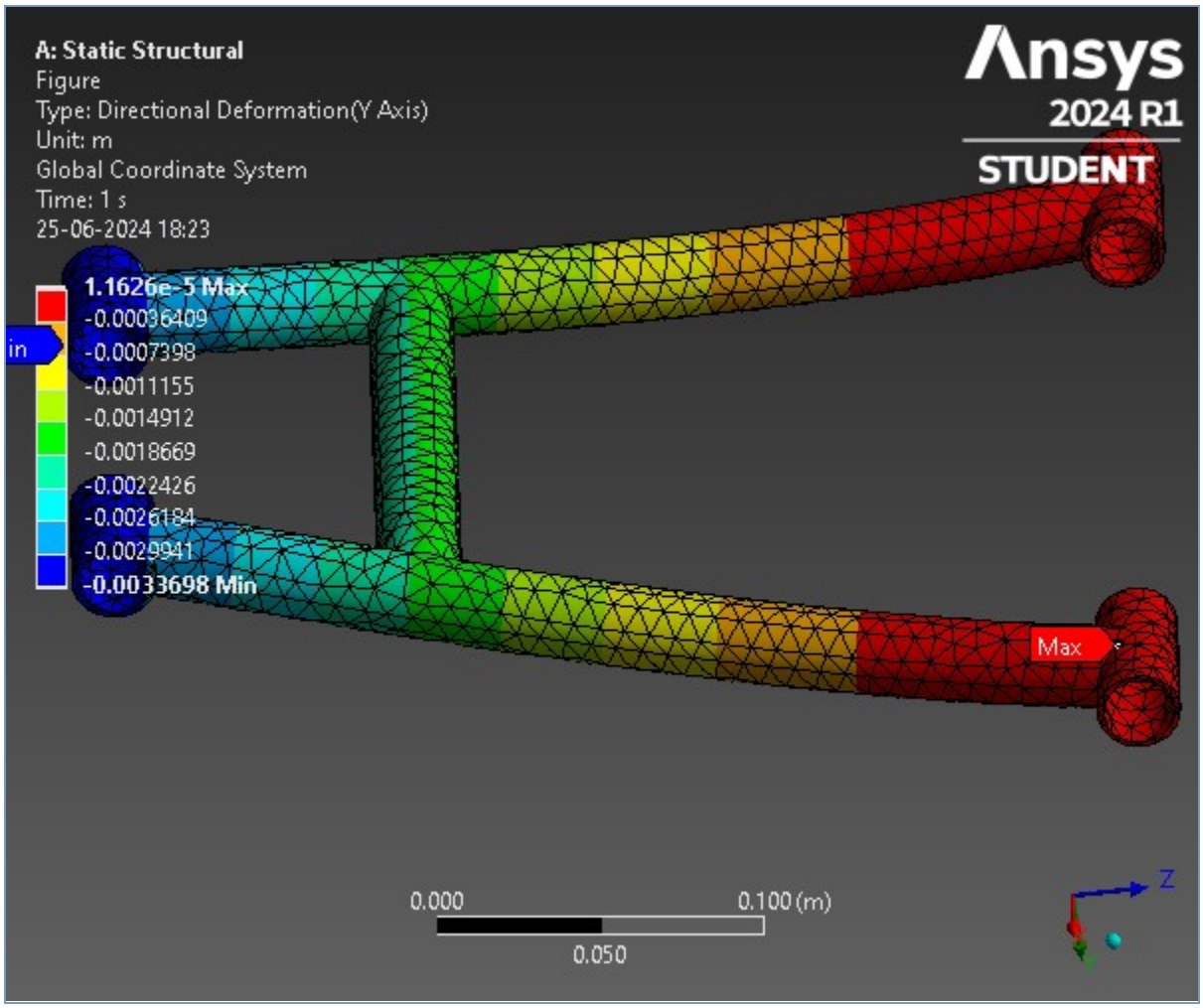



**FIGURE 12**
**Model (A4) > Static Structural (A5) > Solution (A6) > Z Directional Deformation**

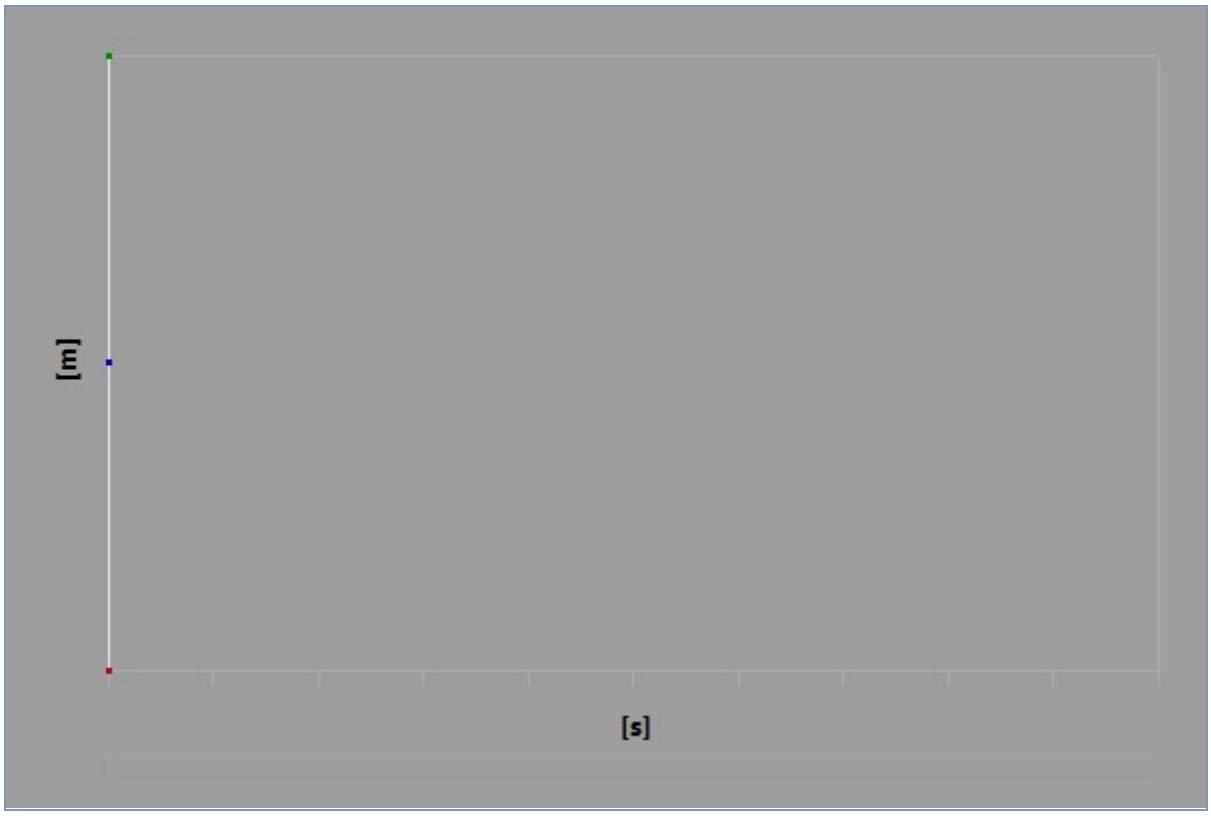



**TABLE 21**
**Model (A4) > Static Structural (A5) > Solution (A6) > Z Directional Deformation**

| Time [s] | Minimum [m] | Maximum [m] | Average [m] |
|---|---|---|---|
| 1. | -1.7566e-004 | 1.9832e-004 | 1.1657e-005 |

**FIGURE 13**
**Model (A4) > Static Structural (A5) > Solution (A6) > Z Directional Deformation > Figure**

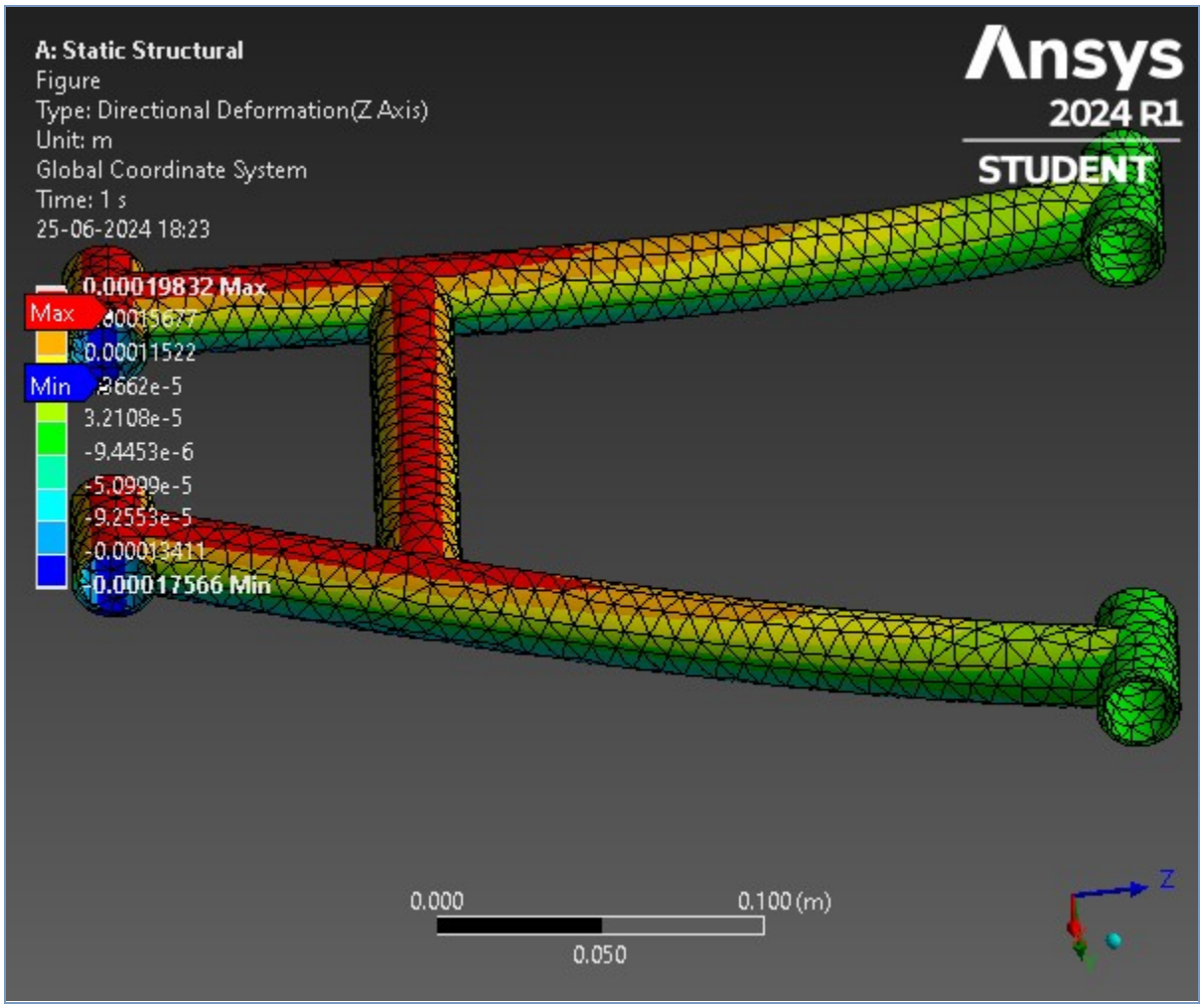



**TABLE 22**
**Model (A4) > Static Structural (A5) > Solution (A6) > Stress Safety Tools**

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

**TABLE 23**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Equivalent 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 | 2.7455 | 1.7455 |
| Minimum Occurs On | Solid | |
| **Information** | | |
| Time | 1. s | |
| Load Step | 1 | |
| Substep | 1 | |
| Iteration Number | 1 | |

**FIGURE 14**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Equivalent Stress Tool > Safety Factor**

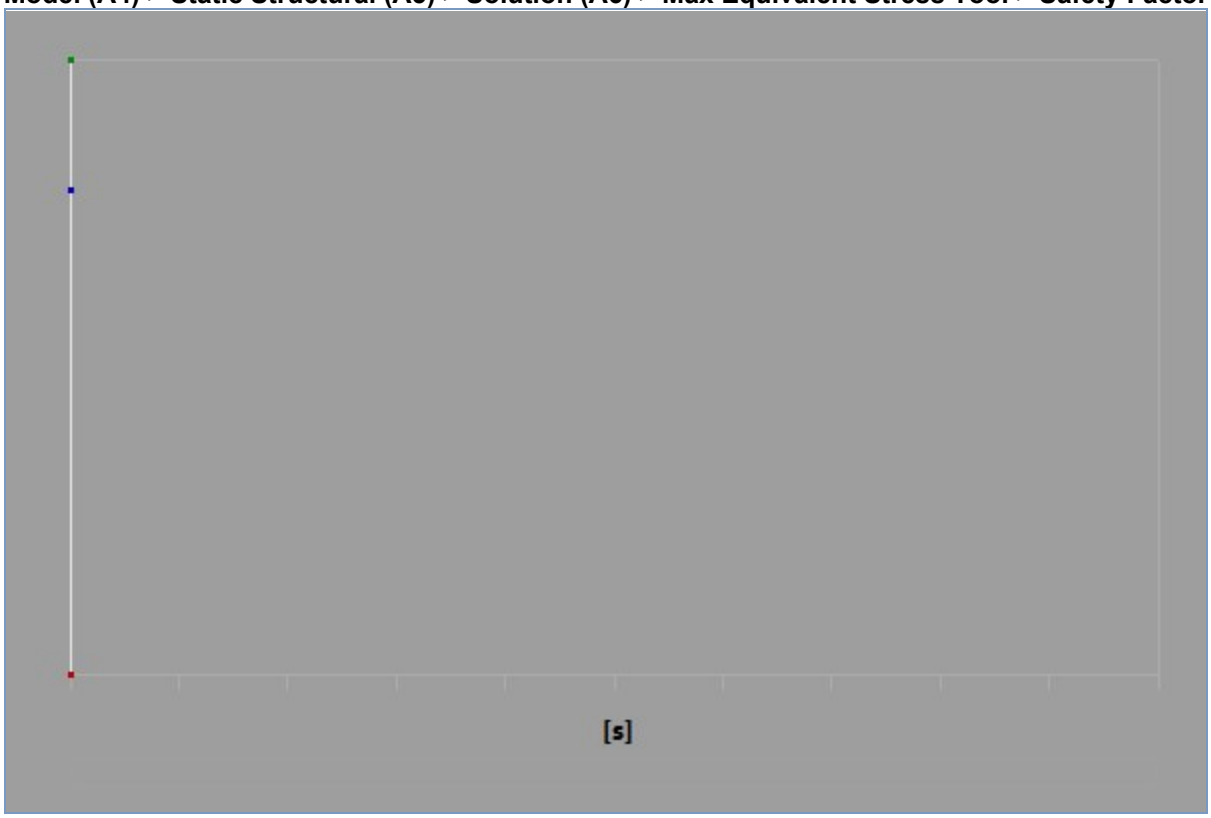



**TABLE 24**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Equivalent Stress Tool > Safety Factor**

| Time [s] | Minimum | Maximum | Average |
|---|---|---|---|
| 1. | 2.7455 | 15. | 12.393 |

**FIGURE 15**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Equivalent Stress Tool > Safety Factor > Figure**

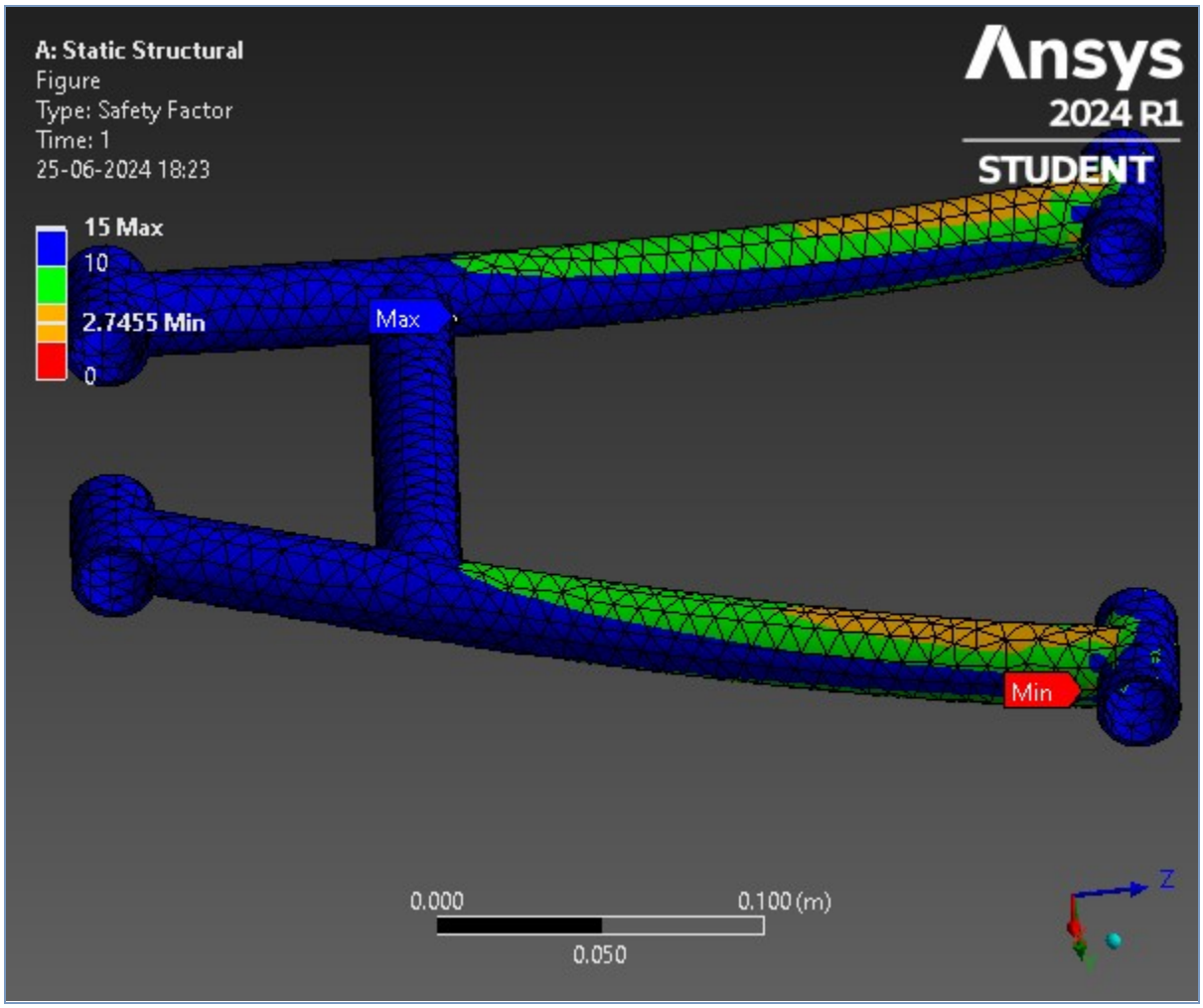



**FIGURE 16**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Equivalent Stress Tool > Safety Margin**

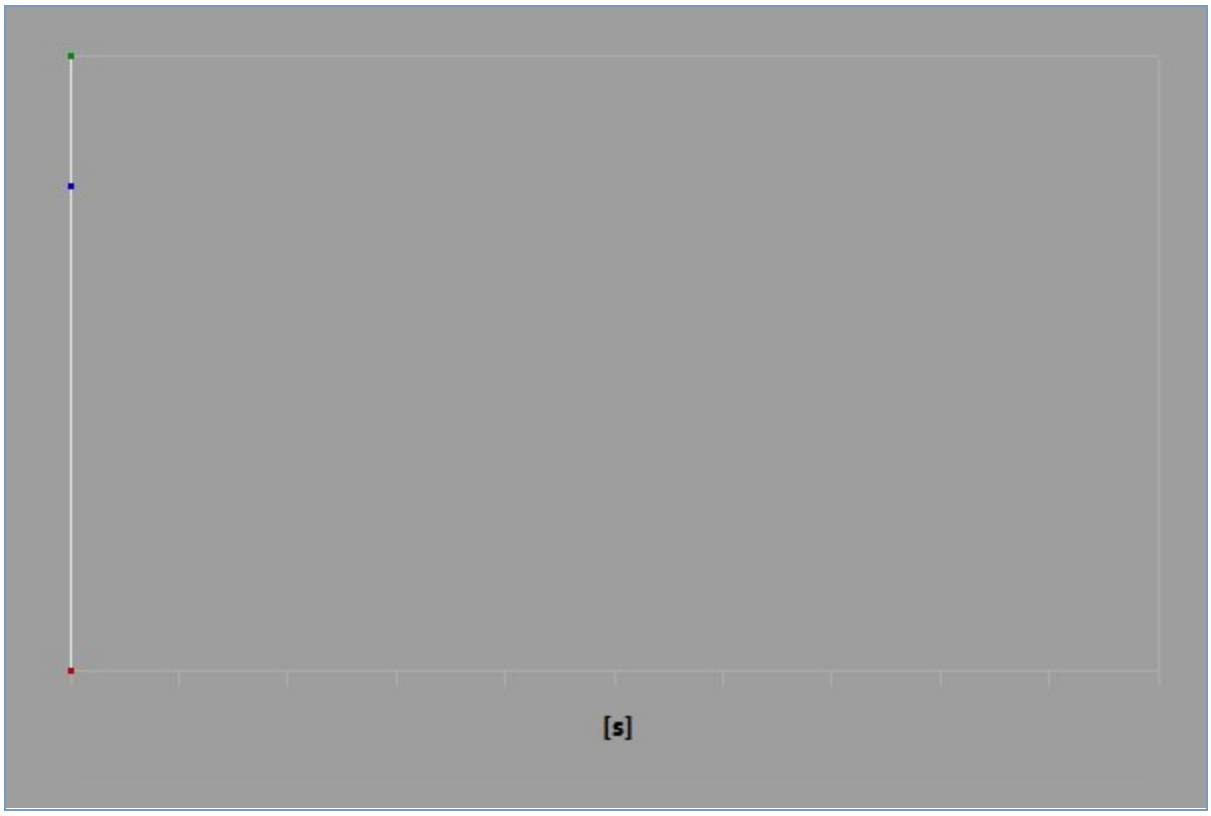



**TABLE 25**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Equivalent Stress Tool > Safety Margin**

| Time [s] | Minimum | Maximum | Average |
|---|---|---|---|
| 1. | 1.7455 | 14. | 11.393 |

**FIGURE 17**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Equivalent Stress Tool > Safety Margin > Figure**

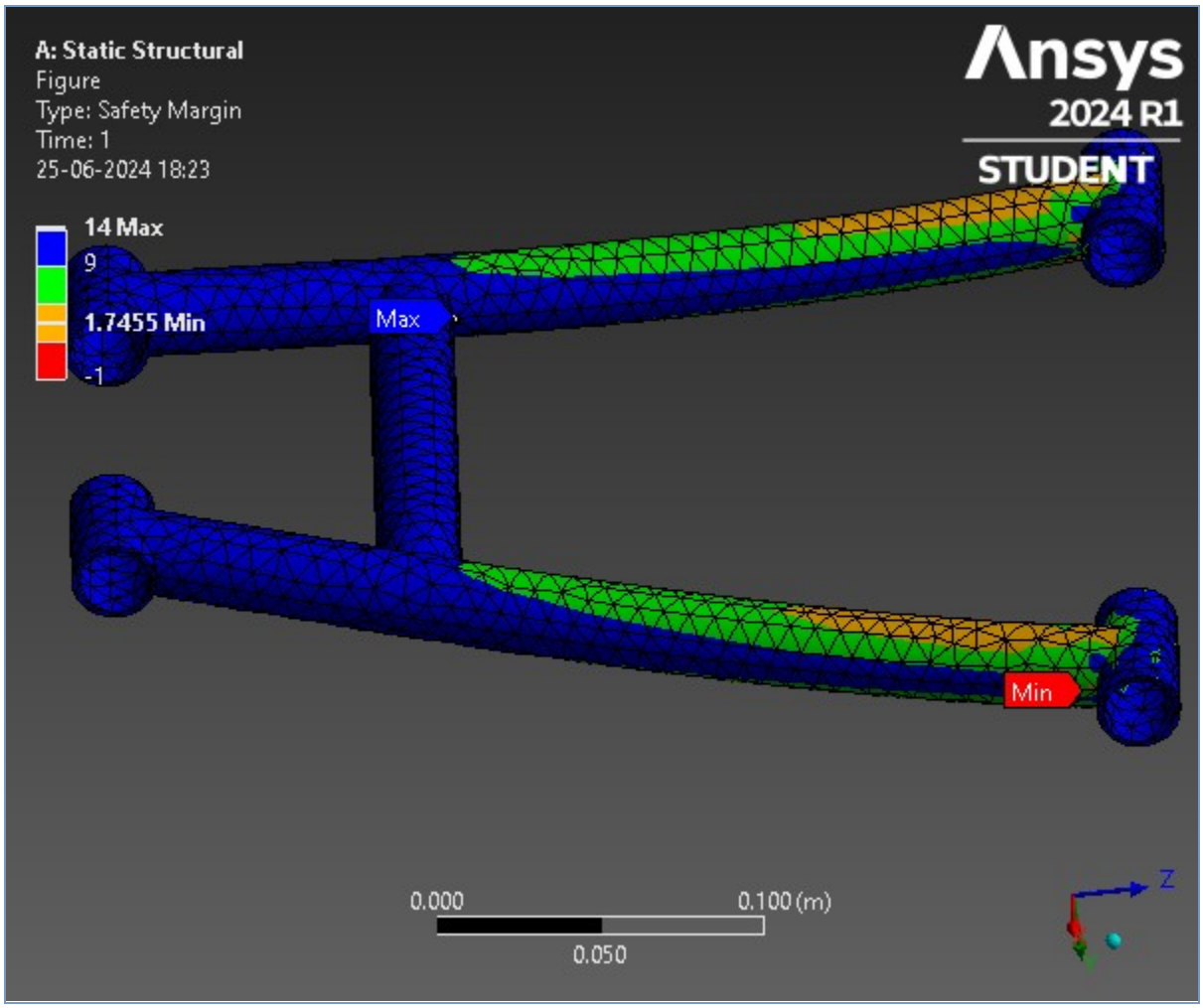



**TABLE 26**
**Model (A4) > Static Structural (A5) > Solution (A6) > Stress Safety Tools**

| Object Name | *Max Sheer Stress Tool* |
|---|---|
| State | Solved |
| **Definition** | |
| Theory | Max Shear Stress |
| Factor | 0.5 |
| Stress Limit Type | Tensile Yield Per Material |

**TABLE 27**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Sheer 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 | 2.7121 | 1.7121 |
| Minimum Occurs On | Solid | |
| **Information** | | |
| Time | 1. s | |
| Load Step | 1 | |
| Substep | 1 | |
| Iteration Number | 1 | |

**FIGURE 18**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Sheer Stress Tool > Safety Factor**

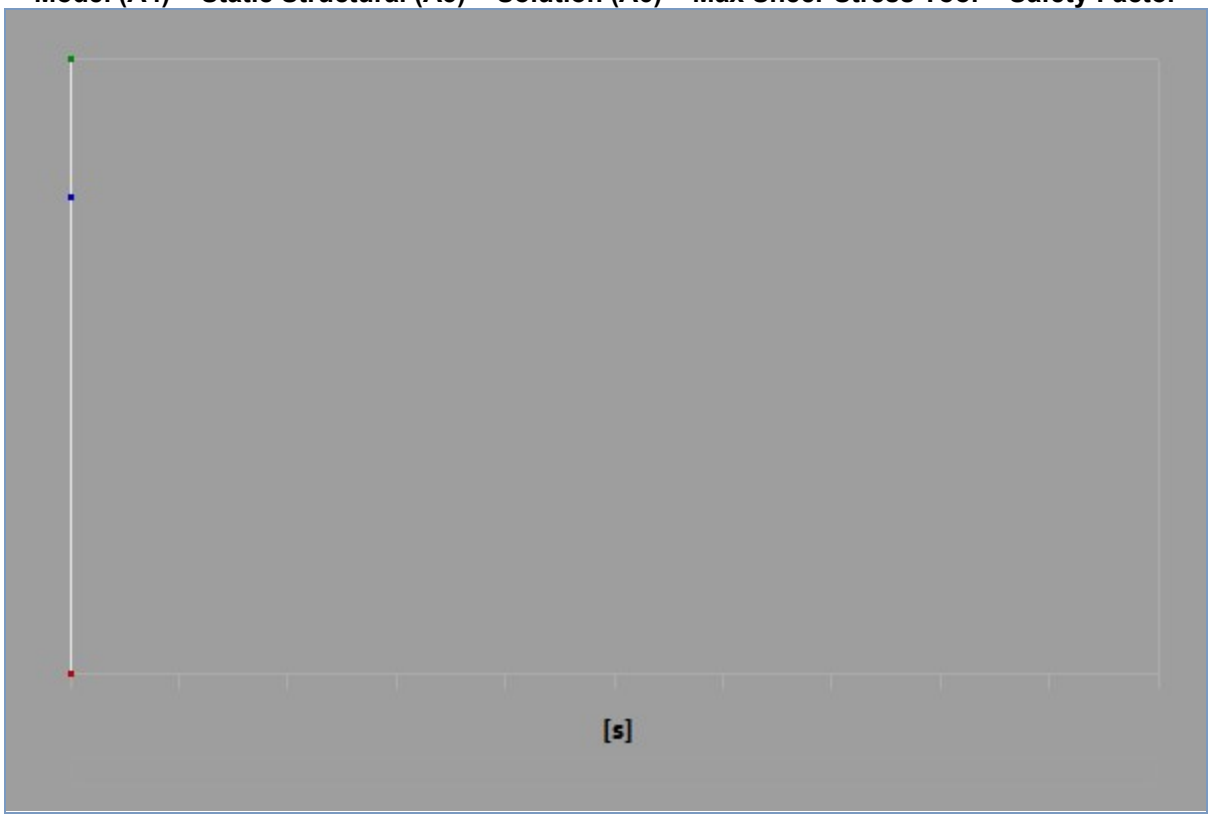



**TABLE 28**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Sheer Stress Tool > Safety Factor**

| Time [s] | Minimum | Maximum | Average |
|---|---|---|---|
| 1. | 2.7121 | 15. | 12.257 |

**FIGURE 19**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Sheer Stress Tool > Safety Factor > Figure**

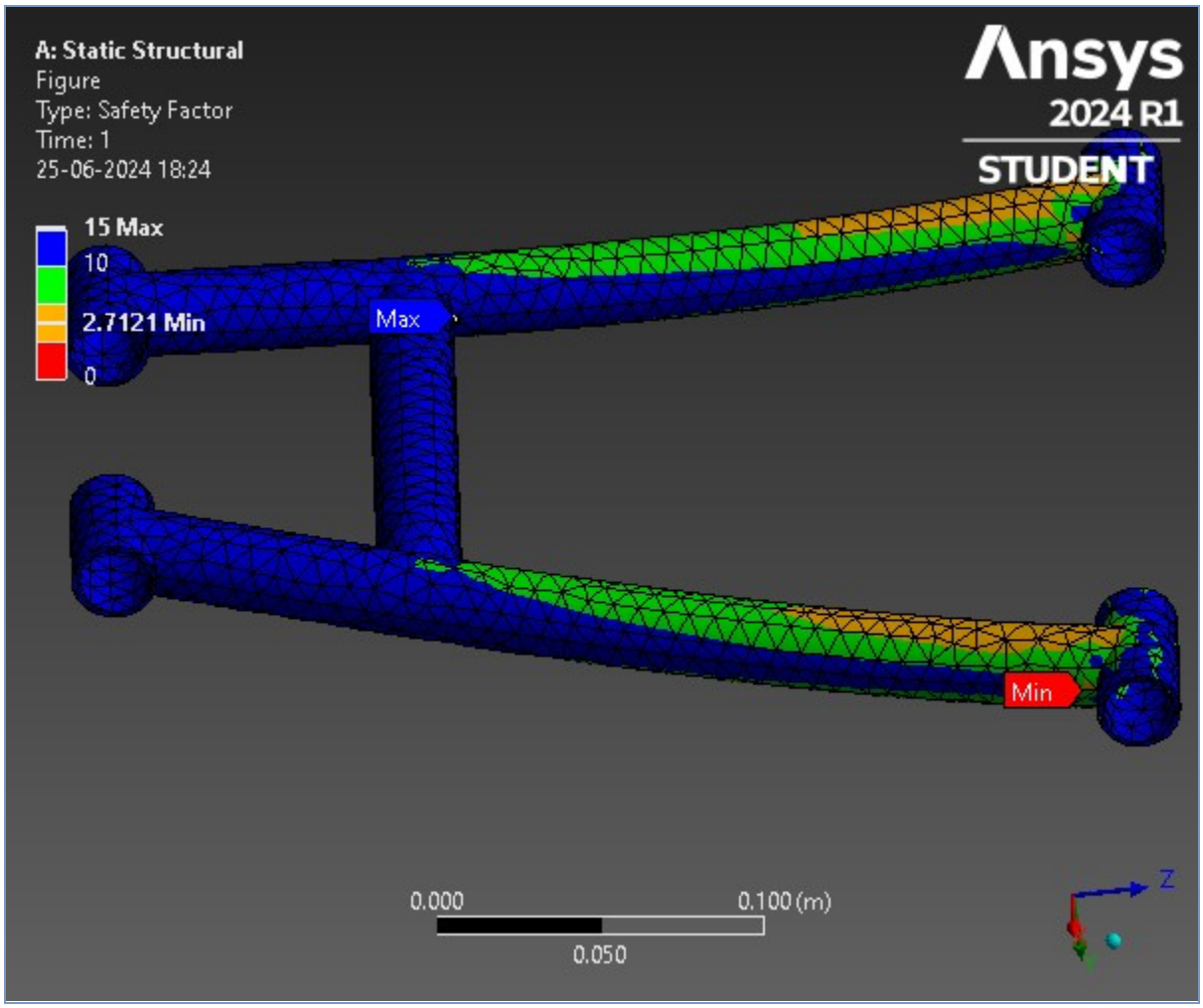



**FIGURE 20**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Sheer Stress Tool > Safety Margin**

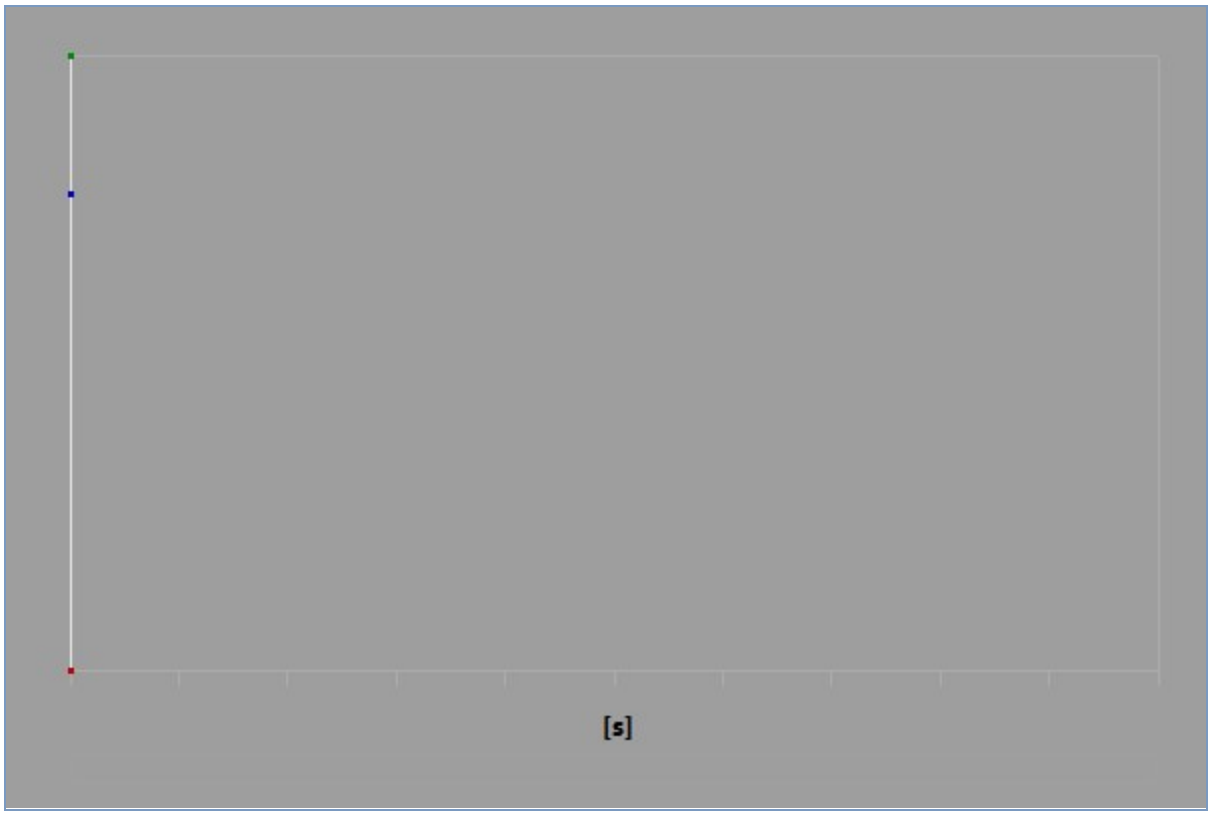



**TABLE 29**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Sheer Stress Tool > Safety Margin**

| Time [s] | Minimum | Maximum | Average |
|---|---|---|---|
| 1. | 1.7121 | 14. | 11.257 |

**FIGURE 21**
**Model (A4) > Static Structural (A5) > Solution (A6) > Max Sheer Stress Tool > Safety Margin > Figure**

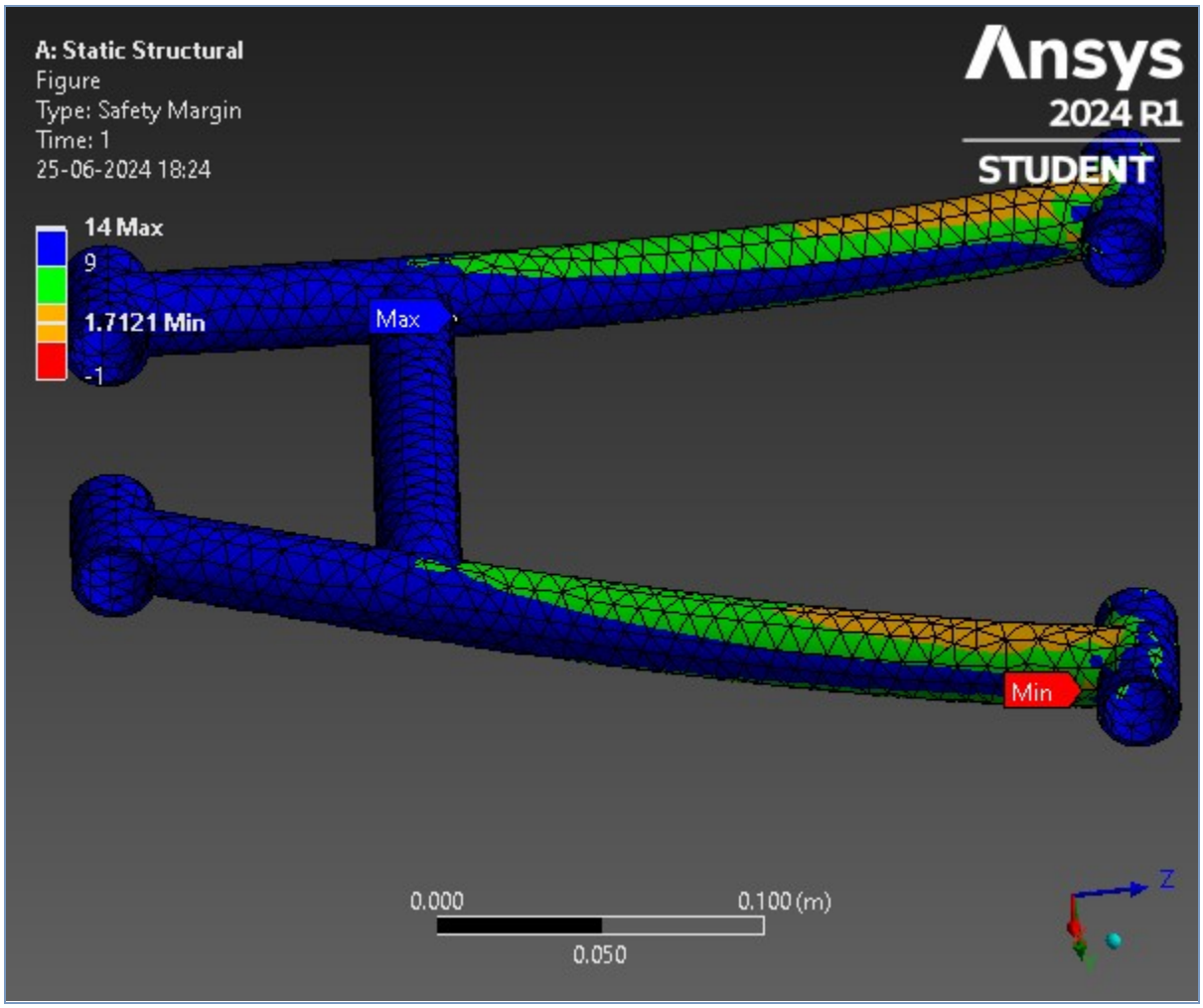



**TABLE 30**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tools**

| Object Name | *Fatigue Tool* |
|---|---|
| State | Solved |
| **Domain** | |
| Domain Type | Time |
| **Materials** | |
| Fatigue Strength Factor (Kf) | 1. |
| **Loading** | |
| Type | Fully Reversed |
| Scale Factor | 1. |
| **Definition** | |
| Display Time | End Time |
| **Options** | |
| Analysis Type | Stress Life |
| Mean Stress Theory | None |
| Stress Component | Equivalent (von-Mises) |
| **Life Units** | |
| Units Name | cycles |
| 1 cycle is equal to | 1. cycles |

**FIGURE 22**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool**

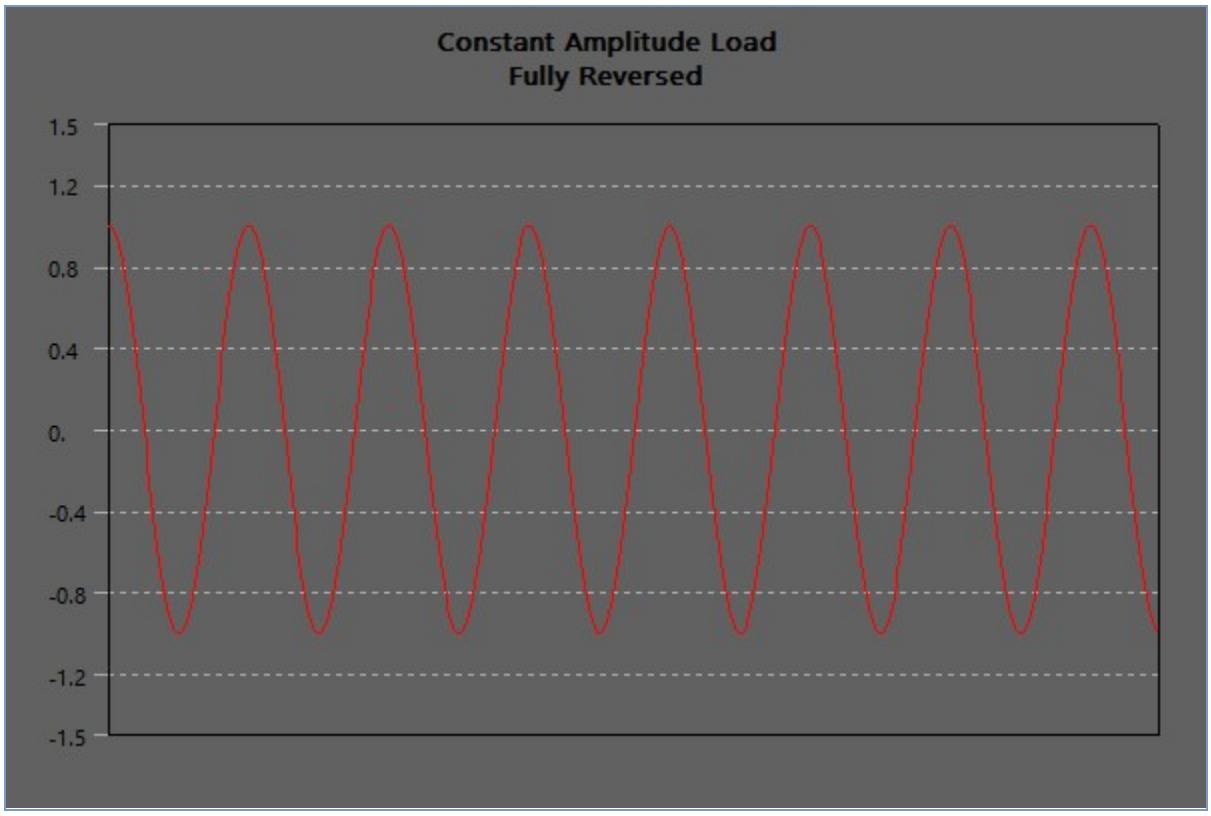



**FIGURE 23**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool**

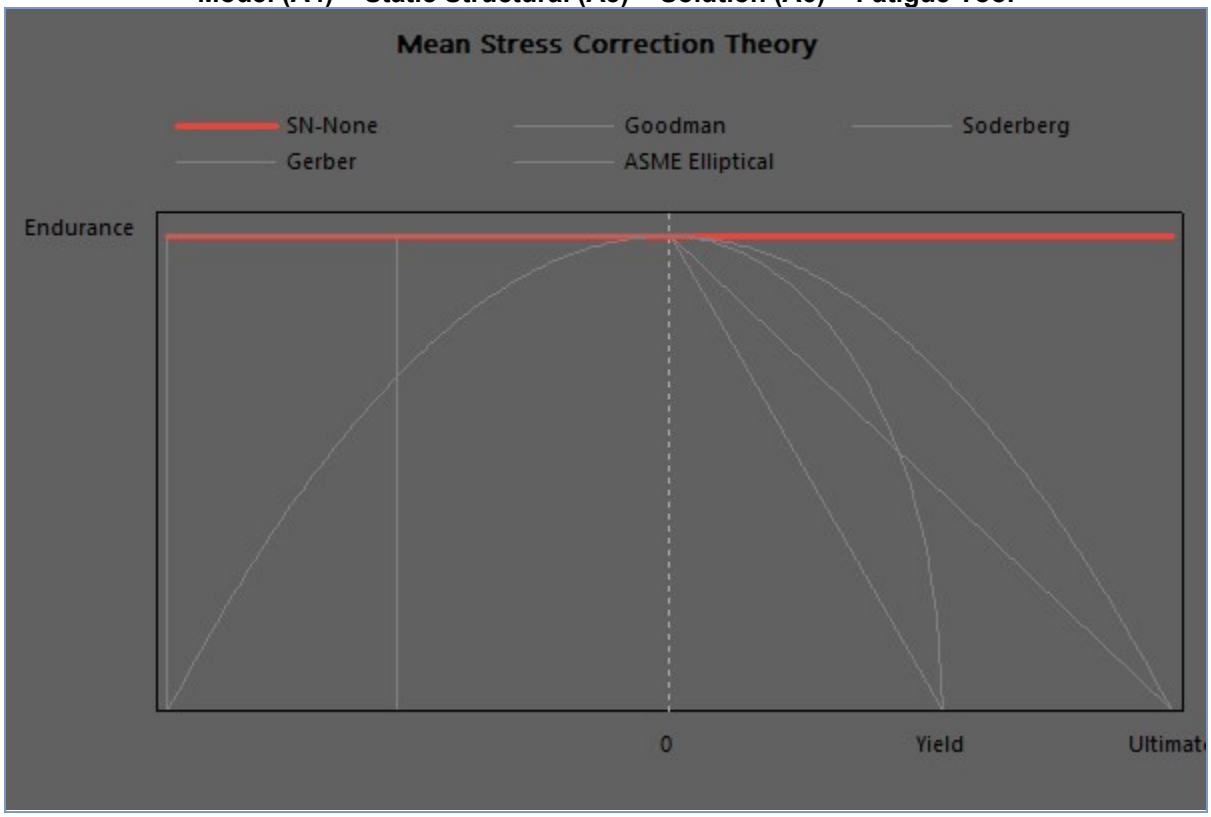



**TABLE 31**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Results**

| Object Name | *Equivalent Alternating Stress* | *Life* | *Safety Factor* |
|---|---|---|---|
| State | Solved | | |
| **Scope** | | | |
| Scoping Method | Geometry Selection | | |
| Geometry | All Bodies | 48 Faces | All Bodies |
| **Definition** | | | |
| Type | Equivalent Alternating Stress | Life | Safety Factor |
| Identifier | | | |
| Suppressed | No | | |
| Design Life | | | 1.e+009 cycles |
| **Results** | | | |
| Minimum | 58704 Pa | 2.7144e+006 cycles | 0.83891 |
| Maximum | 2.6224e+008 Pa | | |
| Average | 5.0257e+007 Pa | | |
| Minimum Occurs On | Solid | | |
| Maximum Occurs On | Solid | | |

**FIGURE 24**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Equivalent Alternating Stress**

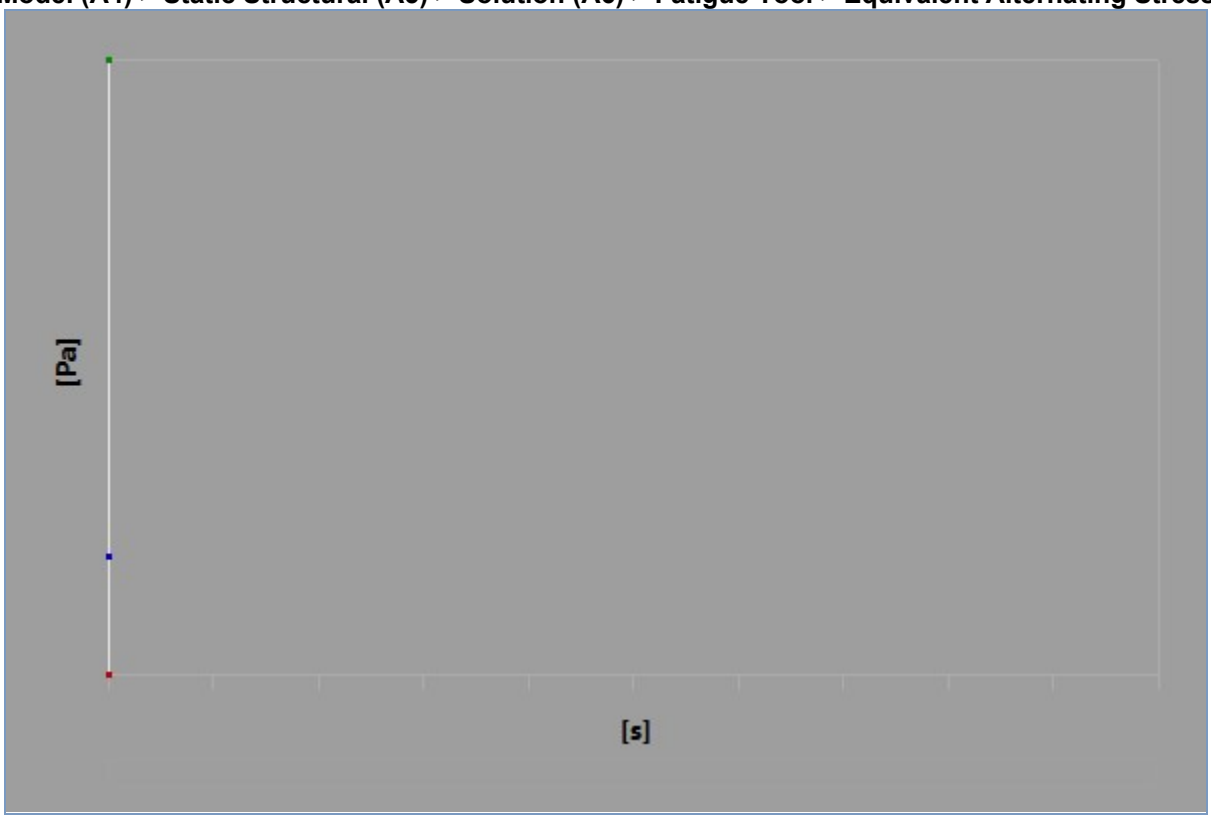



**TABLE 32**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Equivalent Alternating Stress**

| Time [s] | Minimum [Pa] | Maximum [Pa] | Average [Pa] |
|---|---|---|---|
| 1. | 58704 | 2.6224e+008 | 5.0257e+007 |

**FIGURE 25**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Equivalent Alternating Stress > Figure**

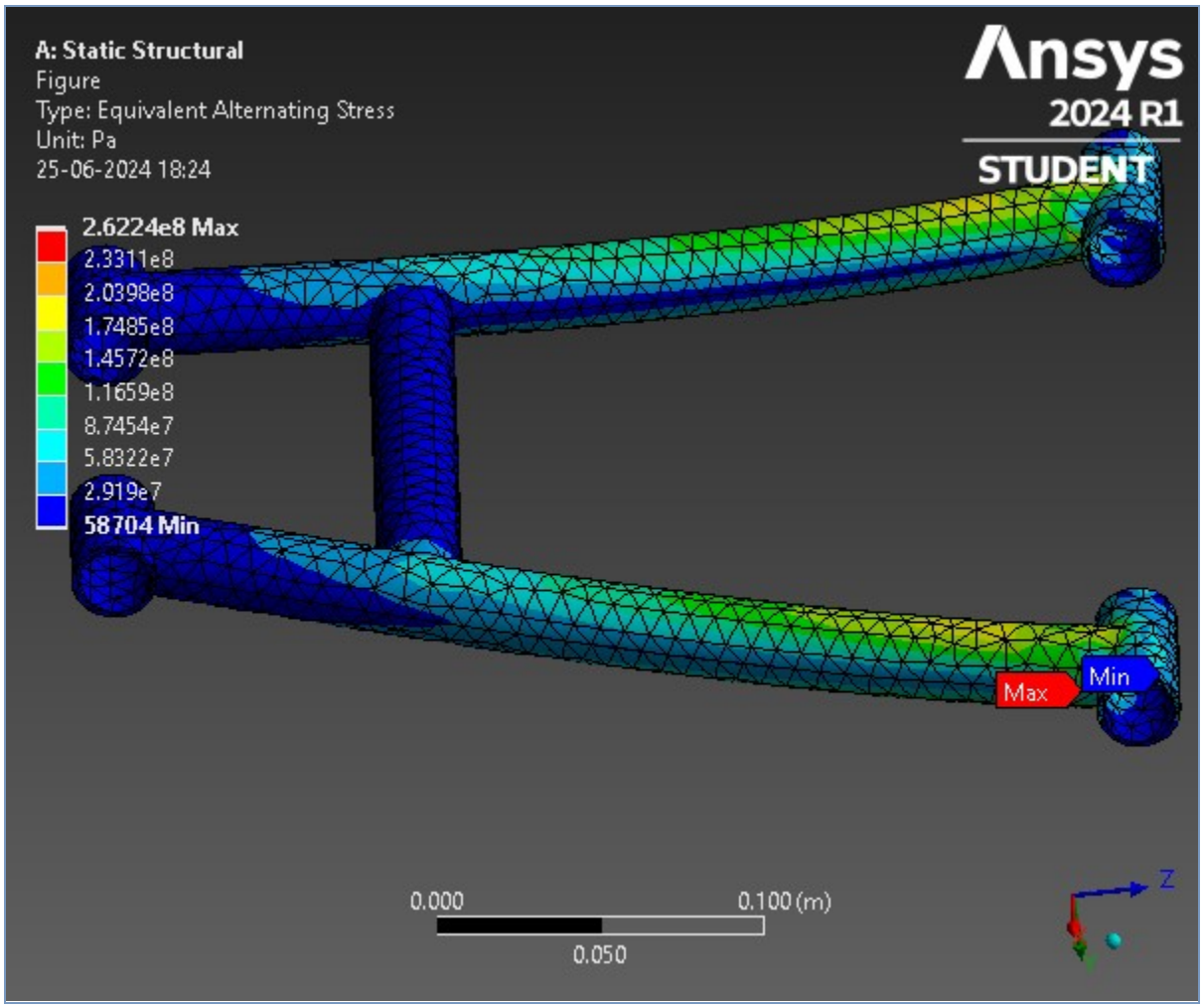



**FIGURE 26**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Life**

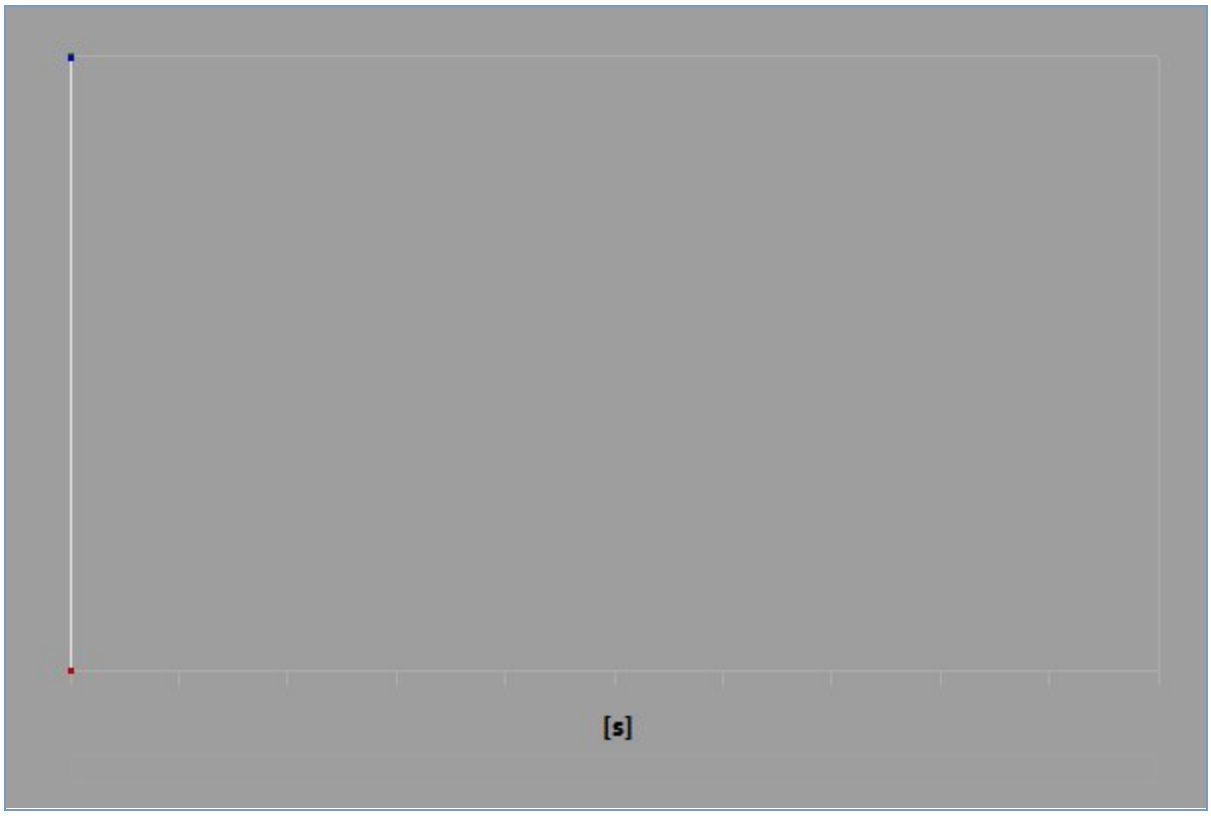



**TABLE 33**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Life**

| Time [s] | Minimum | Maximum | Average |
|---|---|---|---|
| 1. | 2.7144e+006 | 1.e+008 | 9.9593e+007 |

**FIGURE 27**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Life > Figure**

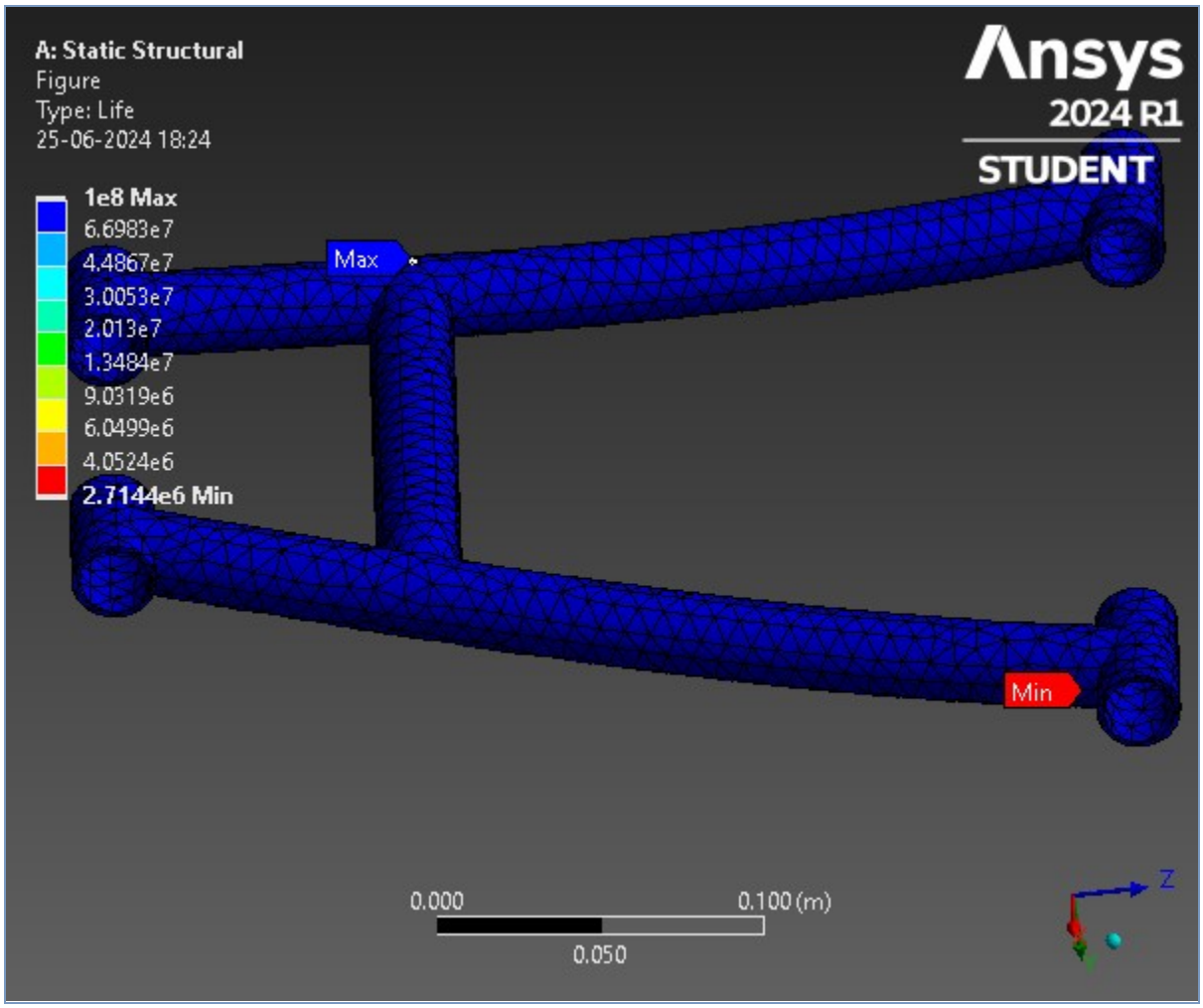



**FIGURE 28**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Safety Factor**

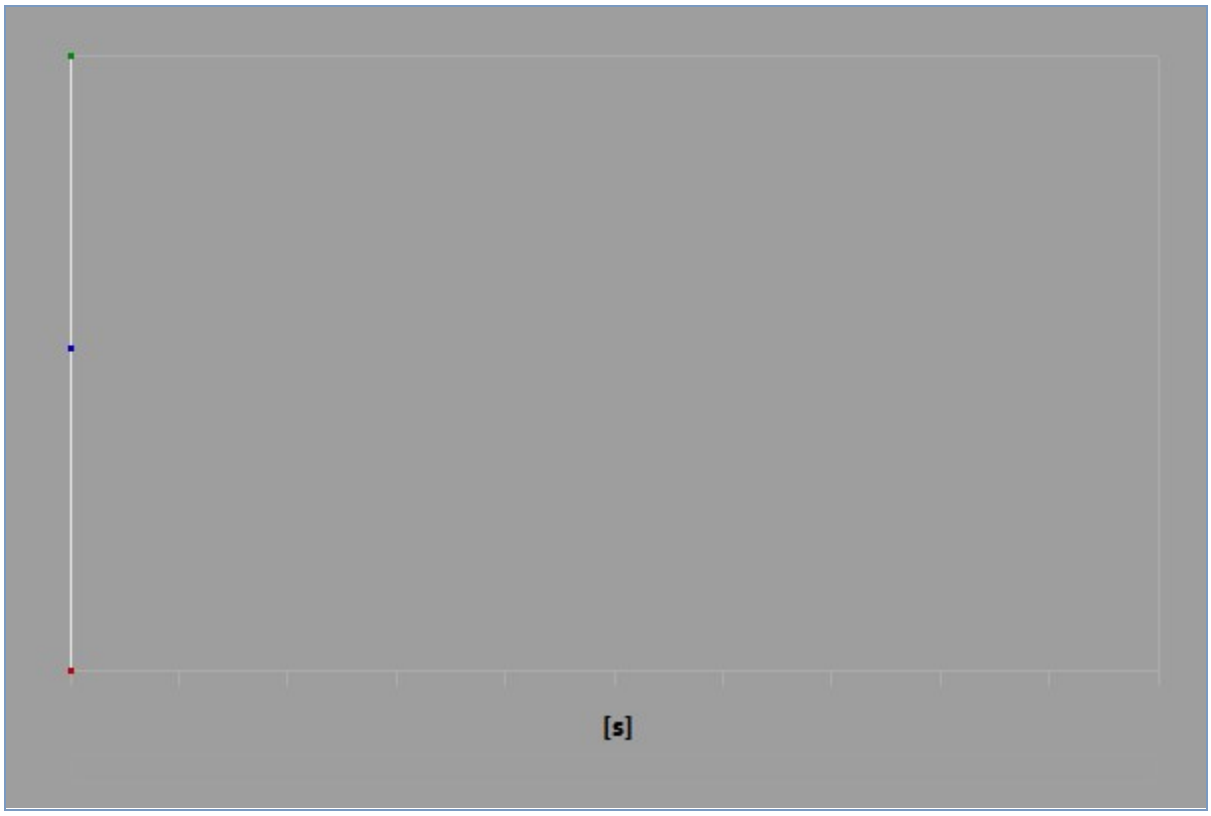
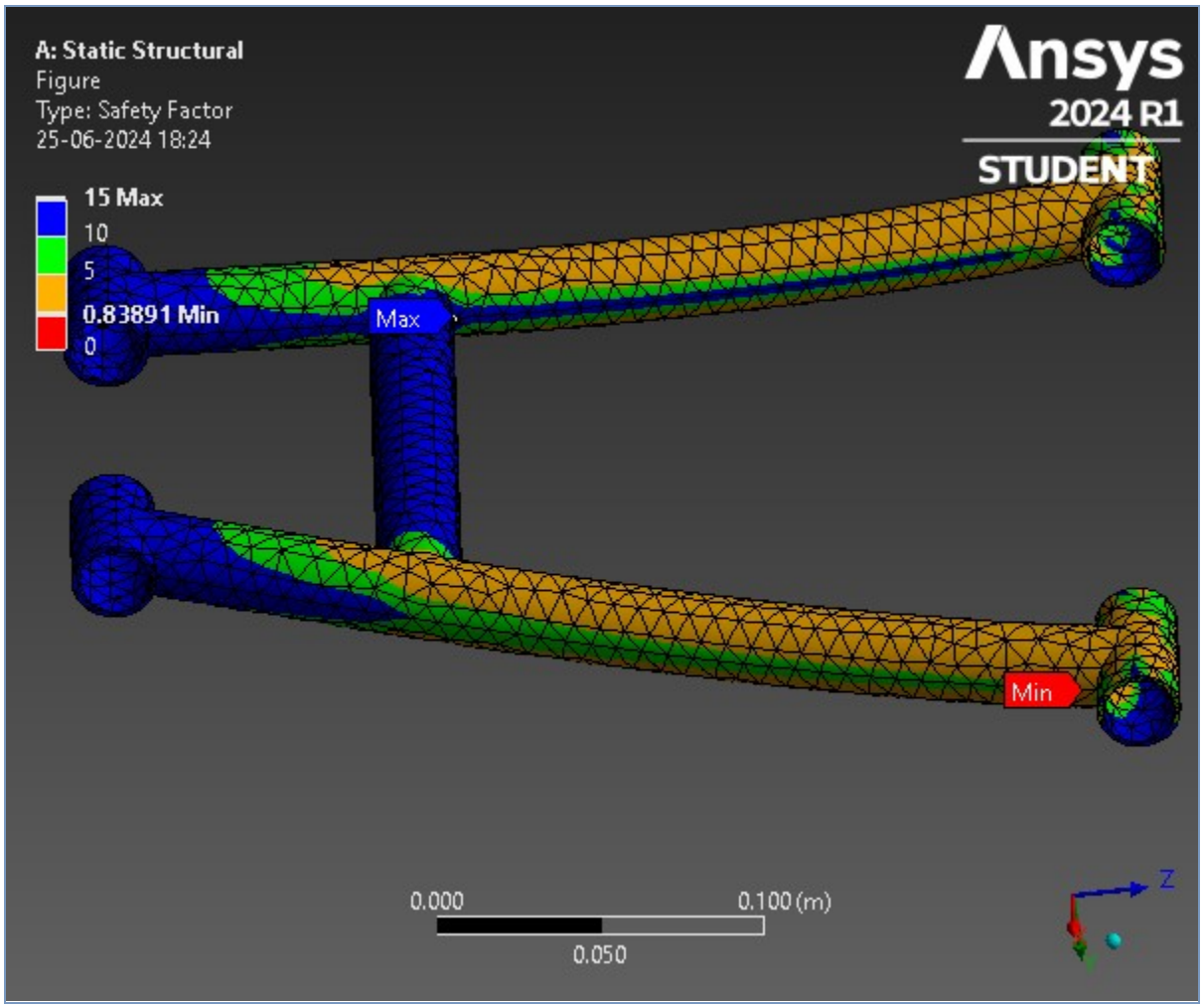



**TABLE 34**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Safety Factor**

| Time [s] | Minimum | Maximum | Average |
|---|---|---|---|
| 1. | 0.83891 | 15. | 8.2828 |

**FIGURE 29**
**Model (A4) > Static Structural (A5) > Solution (A6) > Fatigue Tool > Safety Factor > Figure**




# Material Data

## *Chromoly*

**TABLE 35**
**Chromoly > Constants**

| | |
|---|---|
| Density | 7850 kg m^-3 |
| Coefficient of Thermal Expansion | 1.12e+007 C^-1 |

**TABLE 36**
**Chromoly > Color**

| Red | Green | Blue |
|---|---|---|
| 181 | 155 | 130 |

**TABLE 37**
**Chromoly > Isotropic Elasticity**

| Young's Modulus Pa | Poisson's Ratio | Bulk Modulus Pa | Shear Modulus Pa | Temperature C |
|---|---|---|---|---|
| 2.056e+011 | 0.285 | 1.5938e+011 | 8.e+010 | |

**TABLE 38**
**Chromoly > Tensile Yield Strength**

| Tensile Yield Strength Pa |
|---|

| |
|---|
| 7.2e+008 |

**TABLE 39**
**Chromoly > Tensile Ultimate Strength**

| Tensile Ultimate Strength Pa |
|---|
| 8.4e+008 |

**TABLE 40**
**Chromoly > S-N Curve**

| Alternating Stress Pa | Cycles |
|---|---|
| 3.e+008 | 1.e+006 |
| 2.2e+008 | 1.e+007 |
| 2.2e+008 | 1.e+008 |