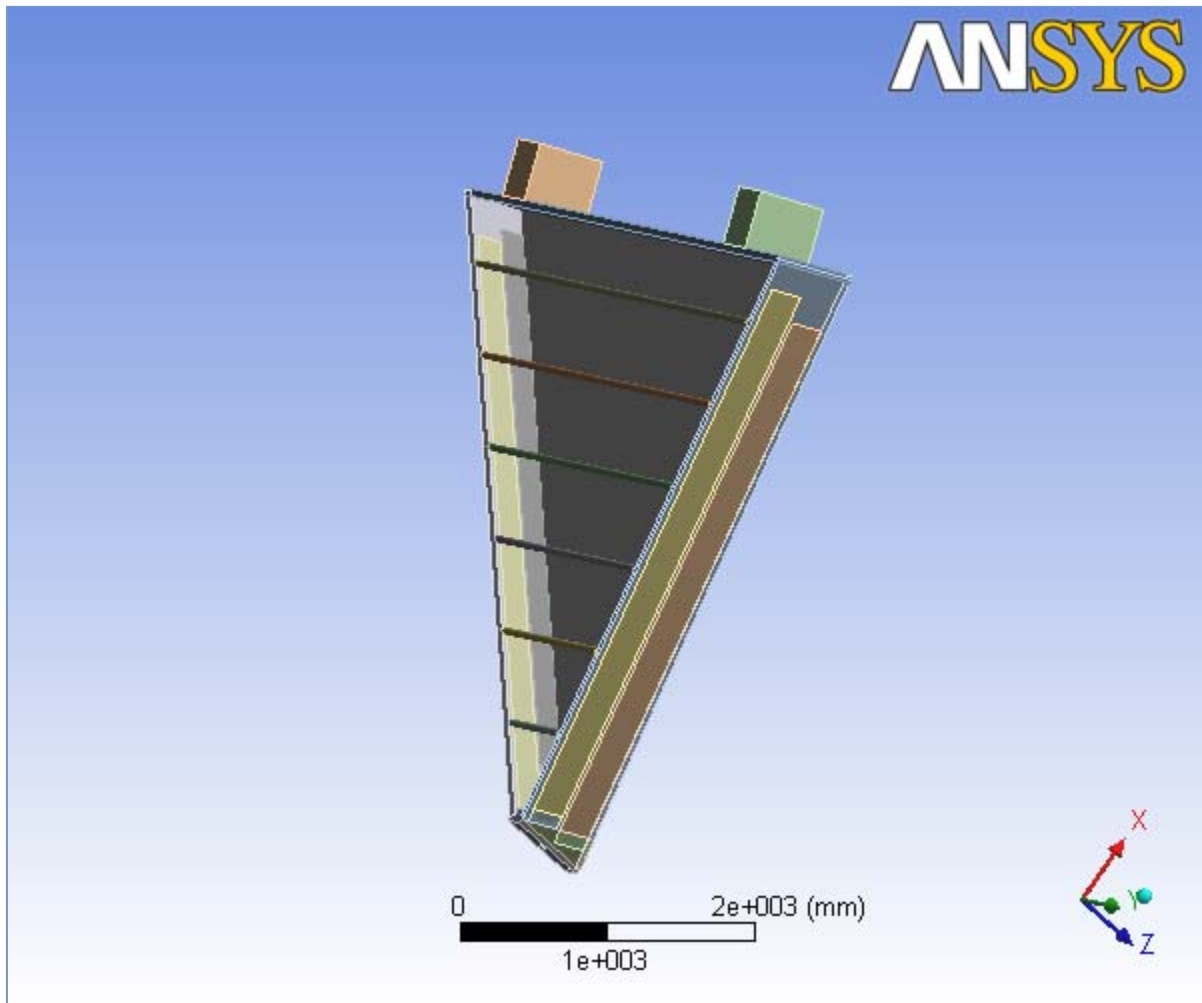




Project

<i>First Saved</i>	<i>Tuesday, February 19, 2008</i>
<i>Last Saved</i>	<i>Tuesday, March 11, 2008</i>
<i>Product Version</i>	<i>11.0 Release</i>



Contents

- **Analysis 6.1**
 - [Geometry](#)
 - [Parts](#)
 - [Connections](#)
 - [Contact Regions](#)
 - [Mesh](#)
 - [Patch Independent](#)
 - [Named Selections](#)
 - **Static Structural**
 - [Analysis Settings](#)
 - [Acceleration](#)
 - [Loads](#)
 - [Solution](#)
 - [Solution Information](#)
 - [Results](#)
- **Material Data**
 - [Polyurethane](#)
 - [Carbon Fiber](#)
 - [Hexcel sheet](#)
 - [Structural Steel](#)

Units

TABLE 1

Unit System	Metric (mm, kg, N, °C, s, mV, mA)
Angle	Degrees
Rotational Velocity	rad/s

Analysis 6.1

Geometry

TABLE 2
Analysis 6.1 > Geometry

Object Name	<i>Geometry</i>
State	Fully Defined
Definition	
Source	C:\Documents and Settings\Jinnuri\Desktop\website\allaxis.agdb
Type	DesignModeler
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Part Color
Bounding Box	
Length X	4241.3 mm
Length Y	4560.2 mm
Length Z	2675. mm
Properties	

Volume	9.3496e+008 mm ³
Mass	140.56 kg
Statistics	
Bodies	23
Active Bodies	22
Nodes	137810
Elements	169187
Preferences	
Import Solid Bodies	Yes
Import Surface Bodies	Yes
Import Line Bodies	Yes
Parameter Processing	Yes
Personal Parameter Key	DS
CAD Attribute Transfer	No
Named Selection Processing	No
Material Properties Transfer	No
CAD Associativity	Yes
Import Coordinate Systems	No
Reader Save Part File	No
Import Using Instances	Yes
Do Smart Update	No
Attach File Via Temp File	No
Analysis Type	3-D
Mixed Import Resolution	None
Enclosure and Symmetry Processing	Yes

TABLE 3
Analysis 6.1 > Geometry > Parts

Object Name	<i>nose plate</i>	<i>end plate (1) 1 of 3</i>	<i>endplate(2)1 of 2</i>	<i>endplate(1) 2 of 3</i>	<i>endplate (1)3 of 3</i>
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Material	Polyurethane				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
Bounding Box					
Length X	102.03 mm	221.42 mm		3819.7 mm	184.3 mm
Length Y	180.6 mm	160.89 mm		2238.4 mm	139.46 mm
Length Z	581.2 mm			2414.9 mm	233.38 mm
Properties					
Volume	7.6673e+006 mm ³	2.4963e+006 mm ³	3.7036e+006 mm ³	3.6841e+007 mm ³	1.2073e+006 mm ³
Mass	1.8401 kg	0.59912 kg	0.88887 kg	8.8418 kg	0.28975 kg
Centroid X	46.019 mm	91.538 mm	108.97 mm	2247.1 mm	145.03 mm
Centroid Y	8.0978e-016 mm	92.546 mm	-102.61 mm	1337.1 mm	123.43 mm

Centroid Z	288.77 mm	346.17 mm	352.87 mm	-890.99 mm	366.72 mm
Moment of Inertia Ip1	54197 kg·mm ²	13573 kg·mm ²	14824 kg·mm ²	3.3883e+005 kg·mm ²	1152.9 kg·mm ²
Moment of Inertia Ip2	52807 kg·mm ²	14538 kg·mm ²	16681 kg·mm ²	2.0698e+007 kg·mm ²	1315.2 kg·mm ²
Moment of Inertia Ip3	4657.9 kg·mm ²	1293. kg·mm ²	2342.5 kg·mm ²	2.0364e+007 kg·mm ²	320.6 kg·mm ²
Statistics					
Nodes	378	151	125	5821	93
Elements	1368	407	352	17624	253

TABLE 4
Analysis 6.1 > Geometry > Parts

Object Name	<i>end plate 1 hole area non target end</i>	<i>end plate 1 hole area target end 1</i>	<i>end plate 1 hole area target end2</i>	<i>endplate(2) 2 of 2</i>	<i>end plate 2 hole area target end</i>
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Material	Polyurethane				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
Bounding Box					
Length X	3363.1 mm	184.3 mm	3441.6 mm	3819.7 mm	3441.6 mm
Length Y	1974.7 mm	139.46 mm	2020. mm	2238.4 mm	2020. mm
Length Z	1945. mm	233.38 mm	1987.3 mm	2414.9 mm	1987.3 mm
Properties					
Volume	5.0102e+007 mm ³	1.2073e+006 mm ³	5.131e+007 mm ³	3.4426e+007 mm ³	5.131e+007 mm ³
Mass	12.025 kg	0.28975 kg	12.314 kg	8.2623 kg	12.314 kg
Centroid X	1812.9 mm	137.19 mm	1844.3 mm	2274.8 mm	1765.8 mm
Centroid Y	1086.4 mm	118.9 mm	1104.5 mm	-1353. mm	-1059.2 mm
Centroid Z	-531.35 mm	110.68 mm	-808.51 mm	-914.74 mm	-766.25 mm
Moment of Inertia Ip1	47846 kg·mm ²	1152.9 kg·mm ²	48999 kg·mm ²	3.3023e+005 kg·mm ²	48999 kg·mm ²
Moment of Inertia Ip2	1.7302e+007 kg·mm ²	1315.2 kg·mm ²	1.8581e+007 kg·mm ²	1.8e+007 kg·mm ²	1.8581e+007 kg·mm ²
Moment of Inertia Ip3	1.7261e+007 kg·mm ²	320.6 kg·mm ²	1.8539e+007 kg·mm ²	1.7674e+007 kg·mm ²	1.8539e+007 kg·mm ²
Statistics					
Nodes	871	275	902	5853	896
Elements	2337	36	2424	17702	2400

TABLE 5
Analysis 6.1 > Geometry > Parts

Object Name	<i>endplate 2 hole area non target end</i>	<i>back plate</i>	<i>rod4</i>	<i>rod5</i>	<i>rod1</i>
State	Meshed				

Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Material	Polyurethane		Carbon Fiber		
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
Bounding Box					
Length X	3520.1 mm	238.63 mm	50.8 mm		
Length Y	2065.4 mm	4557.2 mm	2558. mm	3167.6 mm	729.16 mm
Length Z	2029.5 mm	493.29 mm	50.8 mm		
Properties					
Volume	5.2517e+007 mm ³	1.1556e+008 mm ³	4.9963e+005 mm ³	6.2009e+005 mm ³	1.3828e+005 mm ³
Mass	12.604 kg	27.734 kg	0.28979 kg	0.35965 kg	8.0201e-002 kg
Centroid X	1891.4 mm	3726.9 mm	2178.5 mm	2706.4 mm	595.07 mm
Centroid Y	-1131.7 mm	0.19075 mm	-6.2893e-010 mm	9.3264e-009 mm	1.3118e-010 mm
Centroid Z	-573.61 mm	-1695.4 mm	-1126.3 mm	-1411.4 mm	-271.02 mm
Moment of Inertia Ip1	50152 kg·mm ²	4.6347e+007 kg·mm ²	1.5274e+005 kg·mm ²	2.919e+005 kg·mm ²	3267.4 kg·mm ²
Moment of Inertia Ip2	1.9922e+007 kg·mm ²	6.1048e+005 kg·mm ²	173.72 kg·mm ²	215.61 kg·mm ²	48.061 kg·mm ²
Moment of Inertia Ip3	1.9879e+007 kg·mm ²	4.5748e+007 kg·mm ²	1.5274e+005 kg·mm ²	2.919e+005 kg·mm ²	3267.5 kg·mm ²
Statistics					
Nodes	850	7520	15096	13070	17902
Elements	2222	30167	2148	1860	2626

TABLE 6
Analysis 6.1 > Geometry > Parts

Object Name	<i>rod2</i>	<i>rod3</i>	<i>rod6</i>	<i>hexcel</i>	<i>mylar</i>
State	Meshed				Suppressed
Graphics Properties					
Visible	Yes				No
Transparency	1				
Definition					
Suppressed	No				Yes
Material	Carbon Fiber		Hexcel sheet		Structural Steel
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
Bounding Box					
Length X	50.8 mm		3831.1 mm		3549.1 mm
Length Y	1338.8 mm	1948.4 mm	3777.2 mm	4559.1 mm	4202.6 mm
Length Z	50.8 mm		2084.1 mm		1916.6 mm
Properties					
Volume	2.5873e+005 mm ³	3.7918e+005 mm ³	7.4054e+005 mm ³	4.0121e+008 mm ³	2.2063e+005 mm ³

Mass	0.15006 kg	0.21993 kg	0.42951 kg	11.568 kg	1.7319 kg
Centroid X	1122.8 mm	1650.6 mm	3234.3 mm	2514.6 mm	2415.9 mm
Centroid Y	-4.3959e-010 mm	-2.412e-009 mm	1.355e-008 mm	-0.90675 mm	8.2964e-009 mm
Centroid Z	-556.12 mm	-841.22 mm	-1696.5 mm	-776.52 mm	-1225.1 mm
Moment of Inertia Ip1	21253 kg·mm ²	66800 kg·mm ²	4.971e+005 kg·mm ²	1.0036e+007 kg·mm ²	1.2718e+006 kg·mm ²
Moment of Inertia Ip2	89.952 kg·mm ²	131.84 kg·mm ²	257.48 kg·mm ²	1.2923e+007 kg·mm ²	1.6364e+006 kg·mm ²
Moment of Inertia Ip3	21253 kg·mm ²	66800 kg·mm ²	4.971e+005 kg·mm ²	2.2956e+007 kg·mm ²	2.9081e+006 kg·mm ²
Statistics					
Nodes	13856	15554	15590	22570	0
Elements	1968	2212	2220	77604	0

TABLE 7
Analysis 6.1 > Geometry > Parts

Object Name	<i>top hinge area1</i>	<i>top hinge area2</i>	<i>ball joint</i>
State	Meshed		
Graphics Properties			
Visible	Yes		
Transparency	1		
Definition			
Suppressed	No		
Material	Polyurethane		
Stiffness Behavior	Flexible		
Nonlinear Material Effects	Yes		
Bounding Box			
Length X	562.43 mm	25. mm	
Length Y	300. mm	39.658 mm	
Length Z	624.05 mm	39.658 mm	
Properties			
Volume	6.1378e+007 mm ³	11971 mm ³	
Mass	14.731 kg	2.8731e-003 kg	
Centroid X	3935.1 mm		
Centroid Y	1519.7 mm	-1517.9 mm	1.7419e-015 mm
Centroid Z	-1781.8 mm		
Moment of Inertia Ip1	4.3163e+005 kg·mm ²	0.33261 kg·mm ²	
Moment of Inertia Ip2	5.1756e+005 kg·mm ²	0.25283 kg·mm ²	
Moment of Inertia Ip3	3.0689e+005 kg·mm ²	0.25283 kg·mm ²	
Statistics			
Nodes	163	162	112
Elements	626	619	12

Connections

TABLE 8
Analysis 6.1 > Connections

Object Name	<i>Connections</i>
State	Fully Defined
Auto Detection	

Generate Contact On Update	Yes
Tolerance Type	Slider
Tolerance Slider	0.
Tolerance Value	16.945 mm
Face/Face	Yes
Face/Edge	Yes
Edge/Edge	Yes
Priority	Include All
Same Body Grouping	Yes
Revolute Joints	Yes
Fixed Joints	Yes
Transparency	
Enabled	Yes

TABLE 9
Analysis 6.1 > Connections > Contact Regions

Object Name	<i>Bonded - nose plate To ball joint</i>	<i>Bonded - nose plate (1) 1of3</i>	<i>Bonded - nose plate To endplate(2)1 of 2</i>	<i>Bonded - end plate (1) 1of3 To end plate 1 hole area target end 1</i>	<i>Bonded - end plate (1) 1of3 To endplate (1)3 of 3</i>
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	nose plate			end plate (1) 1of3	
Target Bodies	ball joint	end plate (1) 1of3	endplate(2)1 of 2	end plate 1 hole area target end 1	endplate (1)3 of 3
Definition					
Type	Bonded				
Scope Mode	Manual				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 10
Analysis 6.1 > Connections > Contact Regions

Object Name	<i>Bonded - end plate (1) 1of3 To endplate(1) 2 of 3</i>	<i>Bonded - end plate (1) 1of3 To endplate(1) 2 of 3</i>	<i>Bonded - end plate 1 hole area target end 1 To end plate 1 hole area target end2</i>	<i>Bonded - endplate (1)3 of 3 To end plate 1 hole area non target end</i>	<i>Bonded - endplate (1) 2 of 3 To end plate 1 hole area target end2</i>
State	Fully Defined				
Scope					
Scoping					

Method	Geometry Selection				
Contact	2 Faces	1 Edge	1 Face		
Target	2 Faces	1 Edge	1 Face		
Contact Bodies	end plate (1) 1of3		end plate 1 hole area target end 1	endplate (1)3 of 3	endplate(1) 2 of 3
Target Bodies	endplate(1) 2 of 3		end plate 1 hole area target end2	end plate 1 hole area non target end	end plate 1 hole area target end2
Definition					
Type	Bonded				
Scope Mode	Manual				
Behavior	Symmetric		Symmetric		
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 11
Analysis 6.1 > Connections > Contact Regions

Object Name	<i>Bonded - endplate (1) 2 of 3 To end plate 1 hole area target end2</i>	<i>Bonded - endplate (1) 2 of 3 To end plate 1 hole area non target end</i>	<i>Bonded - endplate (1) 2 of 3 To end plate 1 hole area non target end</i>	<i>Bonded - endplate(1) 2 of 3 To back plate</i>	<i>Bonded - endplate(1) 2 of 3 To back plate</i>
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				1 Edge
Target	1 Face				1 Edge
Contact Bodies	endplate(1) 2 of 3				
Target Bodies	end plate 1 hole area target end2	end plate 1 hole area non target end		back plate	
Definition					
Type	Bonded				
Scope Mode	Manual				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled			Radius	

Pinball Radius	40. mm
----------------	--------

TABLE 12
Analysis 6.1 > Connections > Contact Regions

Object Name	<i>Bonded - endplate (1) 2 of 3 To rod4-rod5-rod1-rod2-rod3-rod6</i>	<i>Bonded - end plate 1 hole area target end2 To rod4-rod5-rod1-rod2-rod3-rod6</i>	<i>Bonded - endplate(2)1 of 2 To endplate (2) 2 of 2</i>	<i>Bonded - endplate(2)1 of 2 To endplate (2) 2 of 2</i>	<i>Bonded - endplate (2) 2 of 2 To endplate 2 hole area non target end</i>
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face			1 Edge	1 Face
Target	6 Faces		3 Faces	1 Edge	1 Face
Contact Bodies	endplate(1) 2 of 3	end plate 1 hole area target end2	endplate(2)1 of 2		endplate(2) 2 of 2
Target Bodies	rod4-rod5-rod1-rod2-rod3-rod6		endplate(2) 2 of 2		endplate 2 hole area non target end
Definition					
Type	Bonded				
Scope Mode	Manual				
Behavior	Symmetric				Symmetric
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 13
Analysis 6.1 > Connections > Contact Regions

Object Name	<i>Bonded - endplate (2) 2 of 2 To endplate 2 hole area non target end</i>	<i>Bonded - endplate (2) 2 of 2 To end plate 2 hole area target end</i>	<i>Bonded - endplate (2) 2 of 2 To end plate 2 hole area target end</i>	<i>Bonded - endplate(2) 2 of 2 To back plate</i>	<i>Bonded - endplate(2) 2 of 2 To back plate</i>
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				1 Edge
Target	1 Face				1 Edge
Contact Bodies	endplate(2) 2 of 2				
Target Bodies	endplate 2 hole area non target end	end plate 2 hole area target end		back plate	
Definition					
Type	Bonded				
Scope Mode	Manual				
Behavior	Symmetric				

Suppressed	No	
Advanced		
Formulation	Pure Penalty	
Normal Stiffness	Program Controlled	
Update Stiffness	Never	
Thermal Conductance	Program Controlled	
Pinball Region	Program Controlled	Radius
Pinball Radius		50. mm

TABLE 14
Analysis 6.1 > Connections > Contact Regions

Object Name	<i>Bonded - endplate(2) 2 of 2 To rod4-rod5-rod1-rod2-rod3-rod6</i>	<i>Bonded - end plate 2 hole area target end To rod4-rod5-rod1-rod2-rod3-rod6</i>	<i>Bonded - hexcel To nose plate</i>	<i>Bonded - hexcel To back plate</i>	<i>Bonded - hexcel To endplate(2) 2 of 2</i>
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face			1 Edge	
Target	6 Faces		1 Face		1 Edge
Contact Bodies	endplate(2) 2 of 2	end plate 2 hole area target end	hexcel		
Target Bodies	rod4-rod5-rod1-rod2-rod3-rod6		nose plate	back plate	endplate(2) 2 of 2
Definition					
Type	Bonded				
Scope Mode	Manual				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled		Radius		
Pinball Radius			30. mm		

TABLE 15
Analysis 6.1 > Connections > Contact Regions

Object Name	<i>Bonded - hexcel To endplate(1) 2 of 3</i>	<i>Bonded - hexcel To back plate</i>	<i>Bonded - back plate To top hinge area1</i>	<i>Bonded - back plate To top hinge area2</i>
State	Fully Defined			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Edge		1 Face	
Target	1 Edge		1 Face	

Contact Bodies	hexcel		back plate	
Target Bodies	endplate(1) 2 of 3	back plate	top hinge area1	top hinge area2
Definition				
Type	Bonded			
Scope Mode	Manual			
Suppressed	No			
Behavior	Symmetric			
Advanced				
Formulation	Pure Penalty			
Normal Stiffness	Program Controlled			
Update Stiffness	Never			
Thermal Conductance	Program Controlled			
Pinball Region	Radius		Program Controlled	
Pinball Radius	30. mm			

Mesh

TABLE 16
Analysis 6.1 > Mesh

Object Name	<i>Mesh</i>
State	Solved
Defaults	
Physics Preference	Mechanical
Relevance	0
Advanced	
Relevance Center	Coarse
Element Size	Default
Shape Checking	Standard Mechanical
Solid Element Midside Nodes	Program Controlled
Straight Sided Elements	No
Initial Size Seed	Active Assembly
Smoothing	Low
Transition	Fast
Statistics	
Nodes	137810
Elements	169187

TABLE 17
Analysis 6.1 > Mesh > Mesh Controls

Object Name	<i>Patch Independent</i>
State	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	14 Bodies
Definition	
Suppressed	No
Method	Tetrahedrons
Algorithm	Patch Independent
Element Midside Nodes	Dropped
Defined By	Max Element Size

Max Element Size	Default
Define Defeaturing Tolerance	Yes
Defeaturing Tolerance	1. mm
Curvature and Proximity Refinement	Yes
Min Size Limit	5. mm
Num Cells Across Gap	Default
Span Angle	Coarse
Minimum Edge Length	7.7856e-003 mm

Named Selections

TABLE 18
Analysis 6.1 > Named Selections > Named Selections

Object Name	<i>Problematic Geometry</i>	<i>Problematic Geometry 2</i>
State	Fully Defined	
Scope		
Geometry	1 Edge	
Statistics		
Type	Manual	
Total Selection	1 Edge	
Suppressed	0	
Hidden	0	

Static Structural

TABLE 19
Analysis 6.1 > Analysis

Object Name	<i>Static Structural</i>
State	Fully Defined
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Options	
Reference Temp	22. °C

TABLE 20
Analysis 6.1 > Static Structural > 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	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Nonlinear Controls	

Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Output Controls	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Documents and Settings\Jinnuri\Desktop\website\allaxis Simulation Files\Static Structural\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

FIGURE 1
Analysis 6.1 > Static Structural > Figure

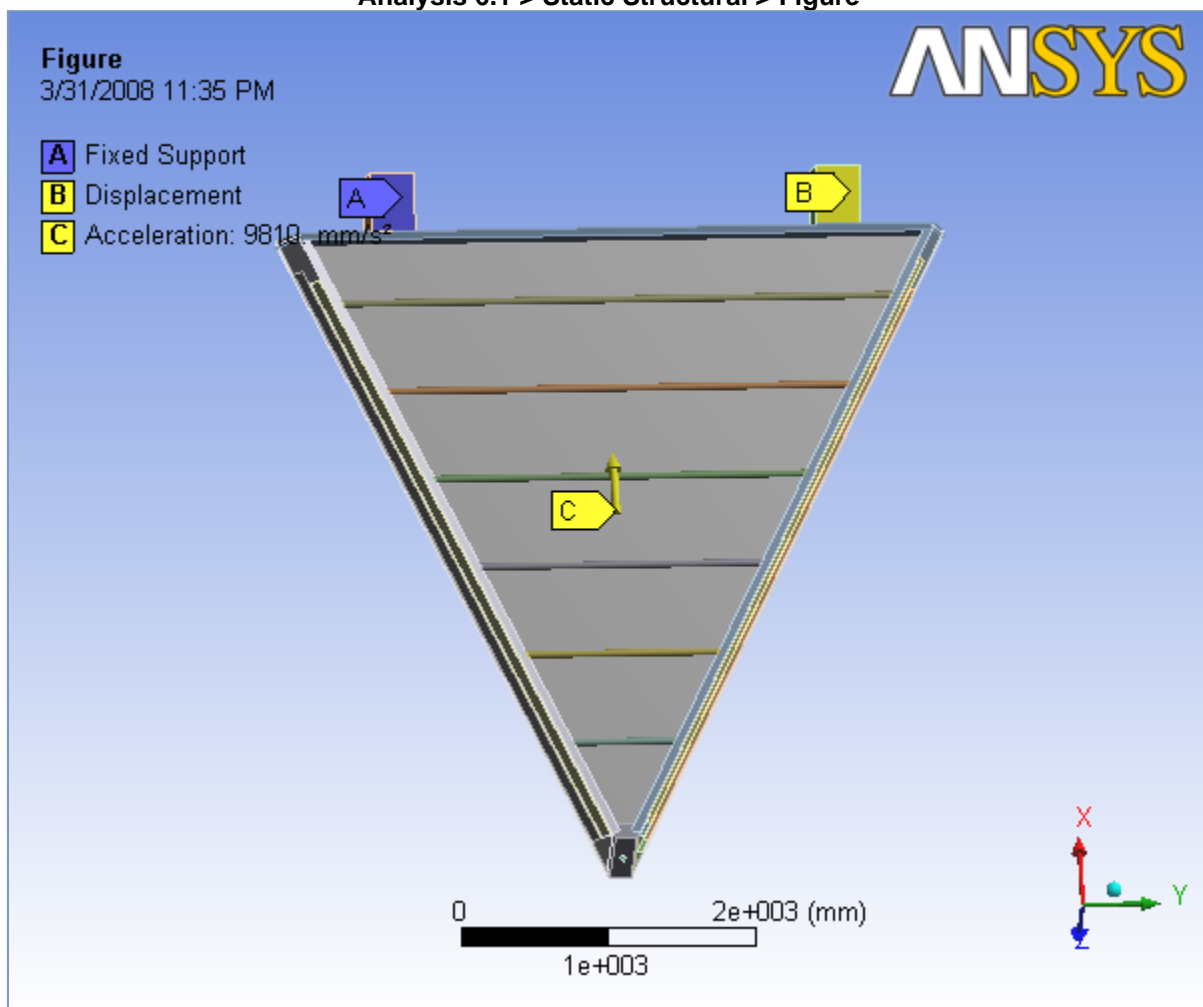


TABLE 21
Analysis 6.1 > Static Structural > Accelerations

Object Name	<i>Acceleration</i>
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
Define By	Components
X Component	9810. mm/s ² (ramped)
Y Component	0. mm/s ² (ramped)
Z Component	0. mm/s ² (ramped)
Suppressed	No

FIGURE 2
Analysis 6.1 > Static Structural > Acceleration

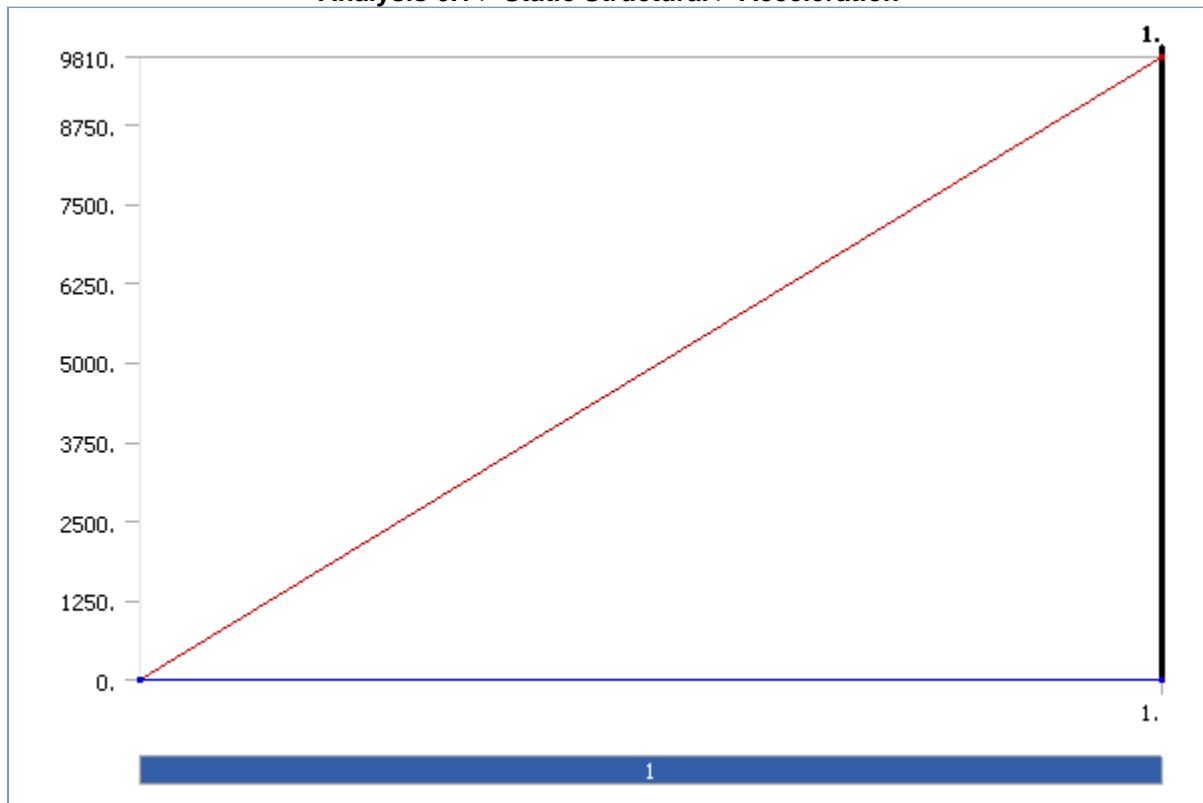


TABLE 22
Analysis 6.1 > Static Structural > Loads

Object Name	<i>Fixed Support</i>	<i>Displacement</i>	<i>Force</i>	<i>Force 2</i>	<i>Force 3</i>
State	Fully Defined		Suppressed		
Scope					
Scoping Method	Geometry Selection				
Geometry	1 Face				
Definition					
Type	Fixed Support	Displacement	Force		
Suppressed	No		Yes		
Define By	Components				
X Component		0. mm (ramped)	-888.73 N (ramped)	614.98 N (ramped)	1381.3 N (ramped)
Y Component		Free	-1223.2 N (ramped)	-1381.3 N (ramped)	614.98 N (ramped)
Z Component		0. mm (ramped)	0. N (ramped)		

FIGURE 3
Analysis 6.1 > Static Structural > Displacement

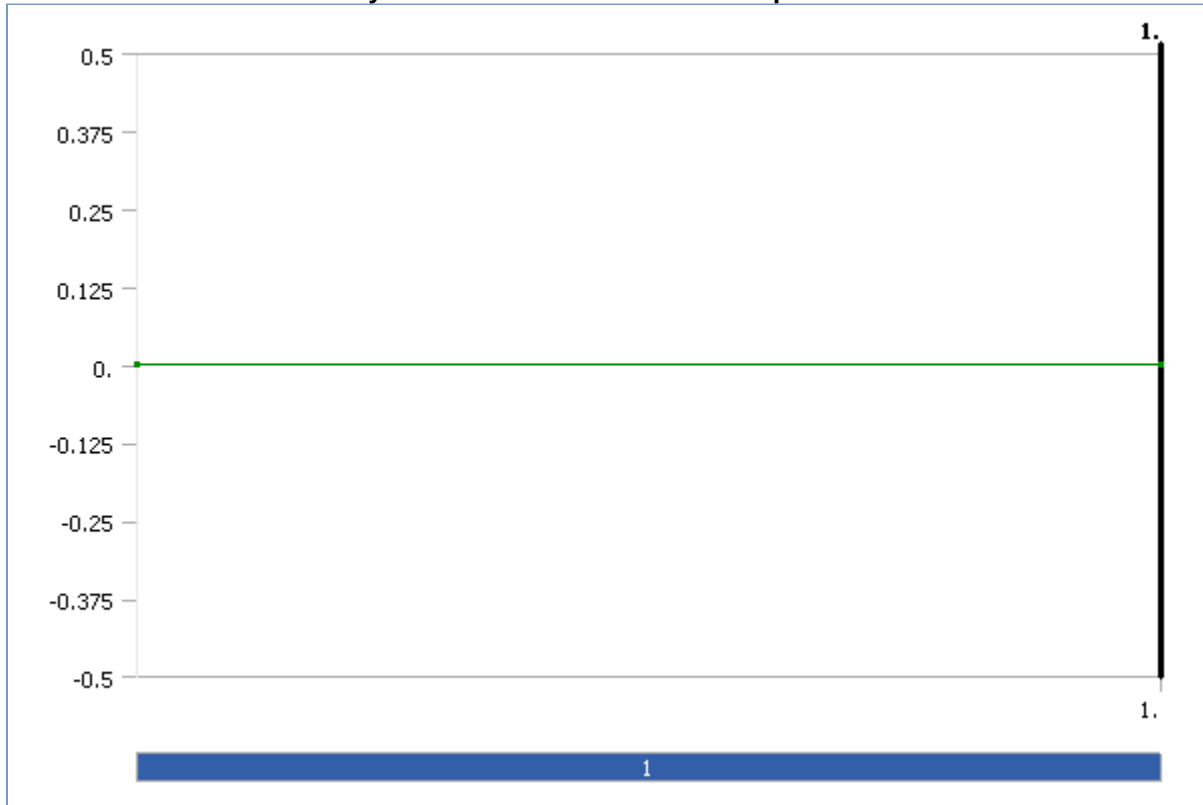


FIGURE 4
Analysis 6.1 > Static Structural > Force

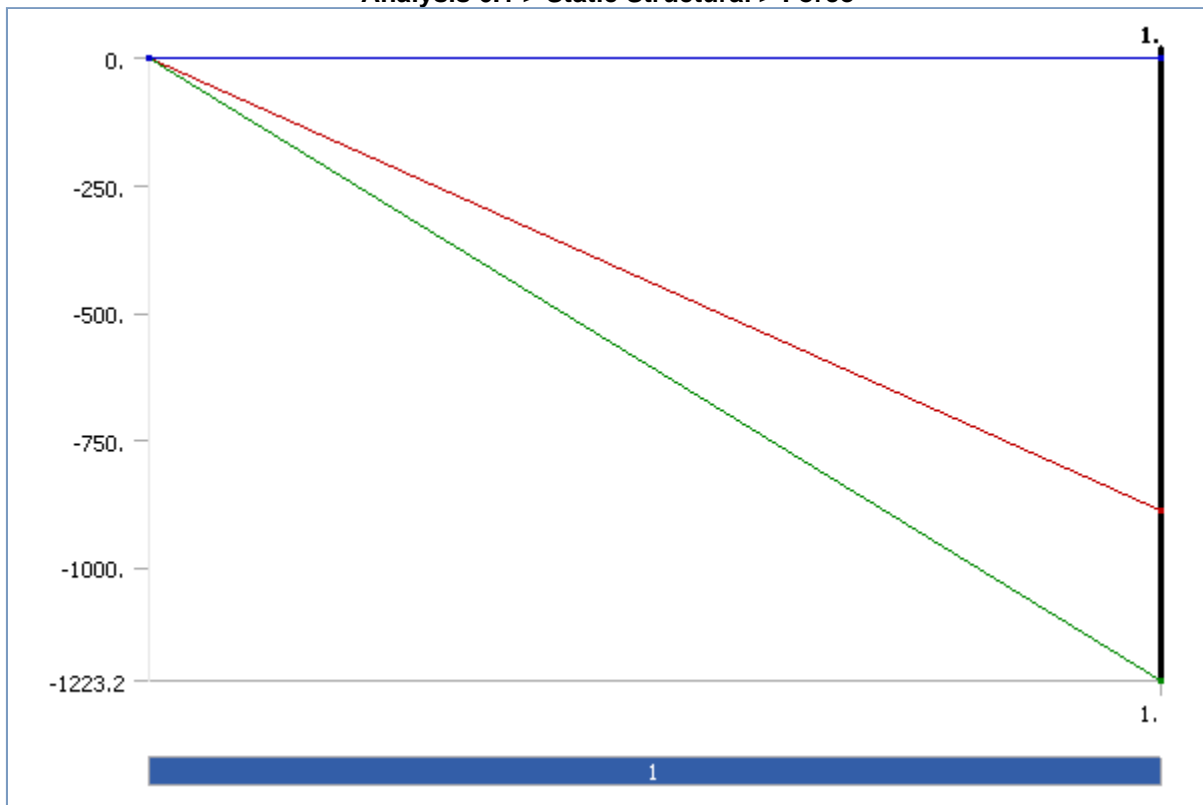


FIGURE 5
Analysis 6.1 > Static Structural > Force 2

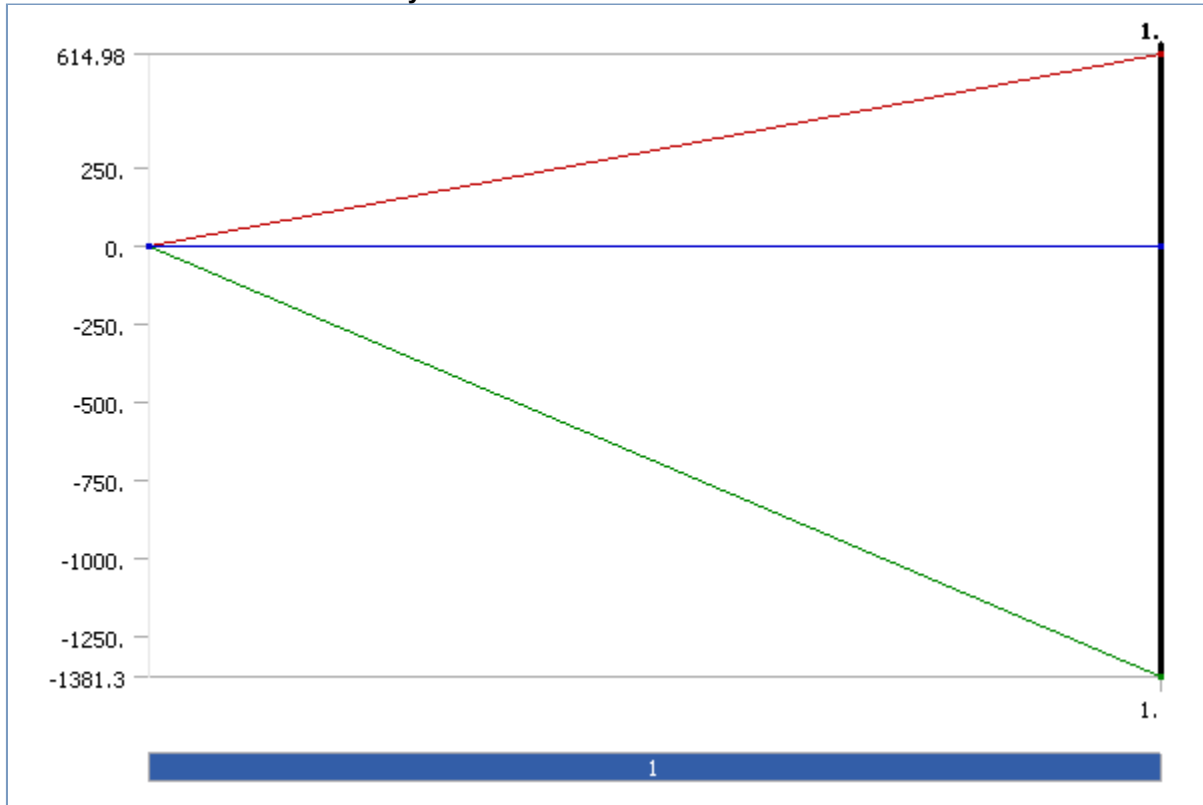


FIGURE 6
Analysis 6.1 > Static Structural > Force 3

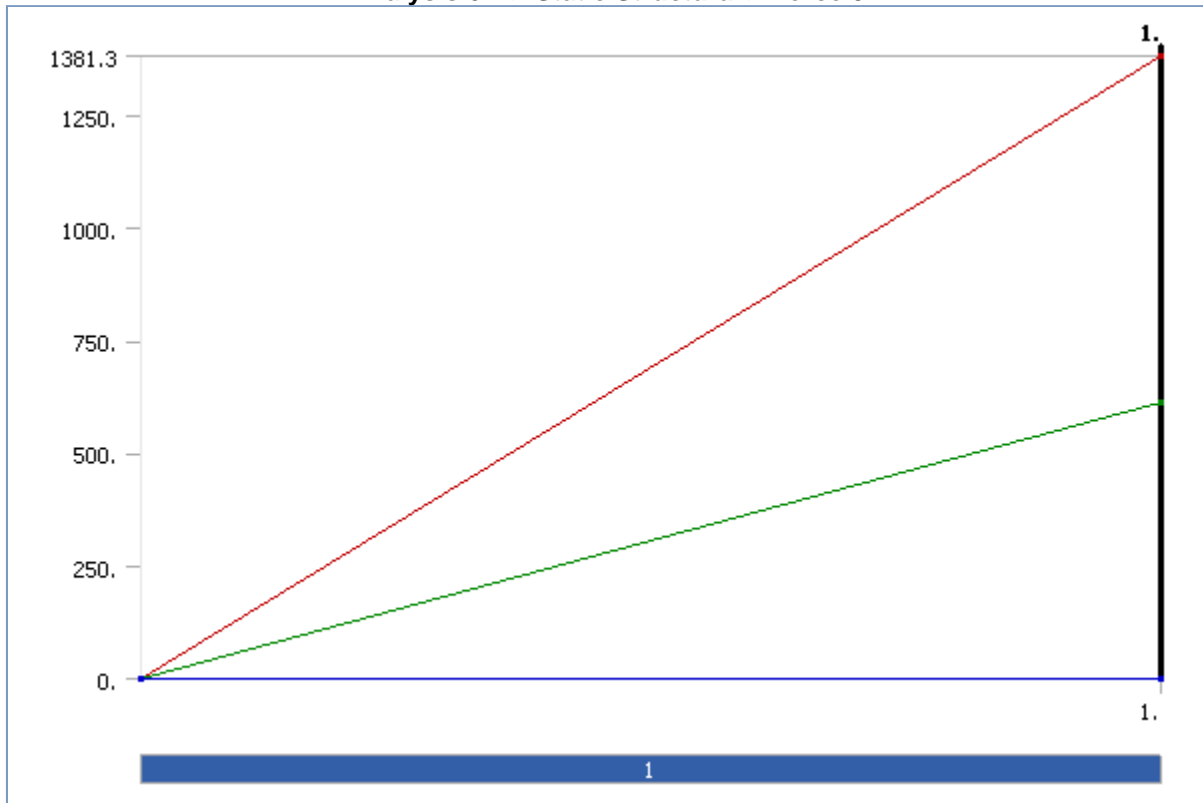
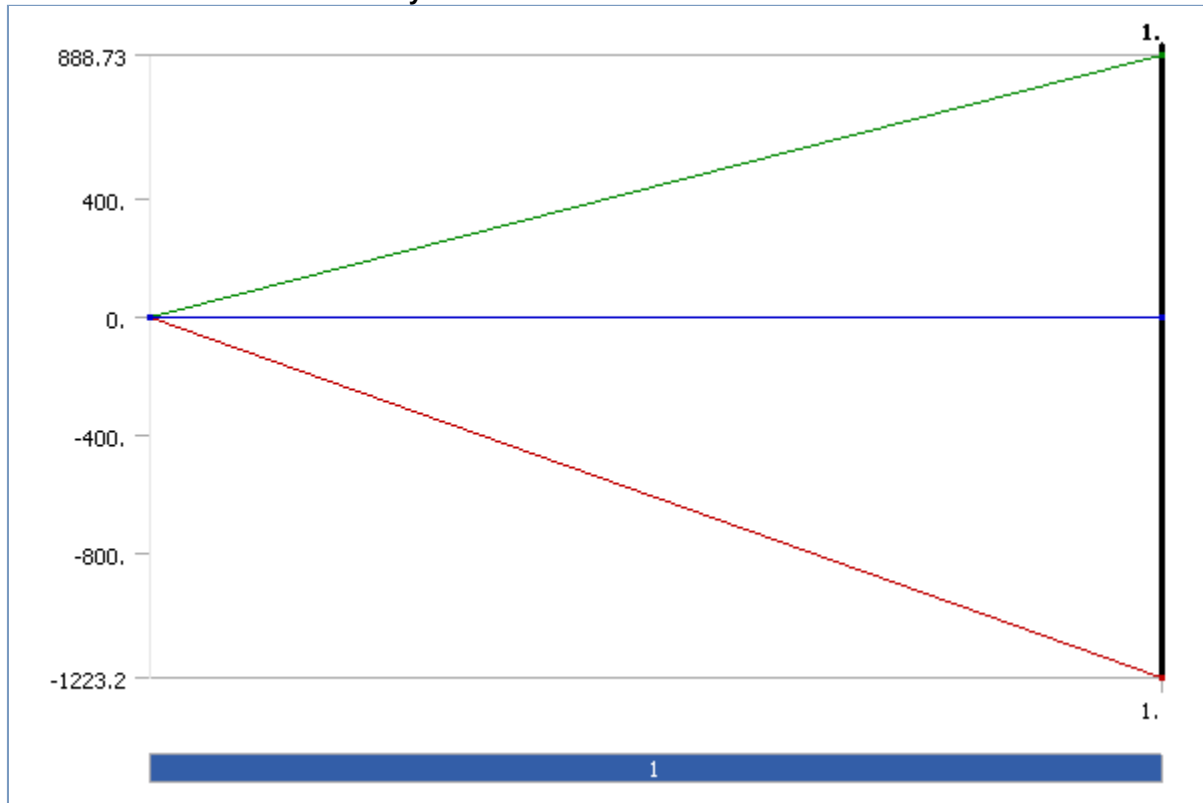


TABLE 23
Analysis 6.1 > Static Structural > Loads

Object Name	<i>Force 4</i>	<i>Fixed Support 2</i>
State	Suppressed	
Scope		
Scoping Method	Geometry Selection	
Geometry	1 Face	
Definition		
Define By	Components	
Type	Force	Fixed Support
X Component	-1223.2 N (ramped)	
Y Component	888.73 N (ramped)	
Z Component	0. N (ramped)	
Suppressed	Yes	

FIGURE 7
Analysis 6.1 > Static Structural > Force 4



Solution

TABLE 24
Analysis 6.1 > Static Structural > Solution

Object Name	<i>Solution</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.

TABLE 25

Analysis 6.1 > Static Structural > Solution > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2.5 s
Display Points	All

TABLE 26
Analysis 6.1 > Static Structural > Solution > Results

Object Name	<i>Total Deformation</i>	<i>x Directional Deformation</i>	<i>y Directional Deformation</i>	<i>z Directional Deformation</i>
State	Solved			
Scope				
Geometry	All Bodies			
Definition				
Type	Total Deformation	Directional Deformation		
Display Time	0.40293 s	End Time		
Orientation		X Axis	Y Axis	Z Axis
Results				
Minimum	0. mm	-0.27832 mm	-5.1667e-003 mm	-0.51798 mm
Maximum	0.58515 mm	5.1025e-002 mm	5.2433e-003 mm	8.2392e-003 mm
Minimum Occurs On	top hinge area2	nose plate	back plate	ball joint
Maximum Occurs On	nose plate	back plate		
Information				
Time	1. s			
Load Step	1			
Substep	1			
Iteration Number	1			

FIGURE 8
Analysis 6.1 > Static Structural > Solution > Total Deformation > Figure

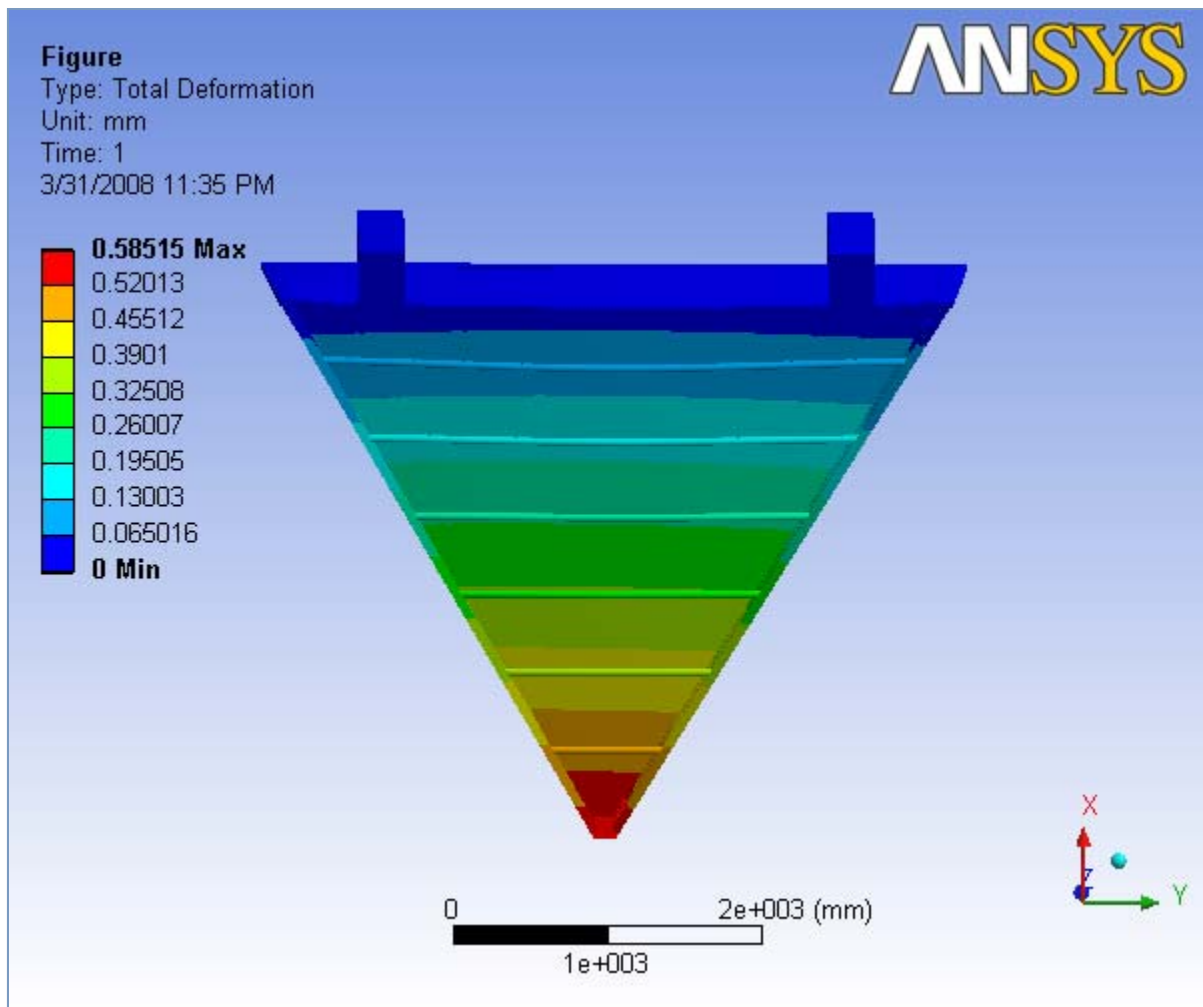


FIGURE 9
Analysis 6.1 > Static Structural > Solution > x Directional Deformation > Figure

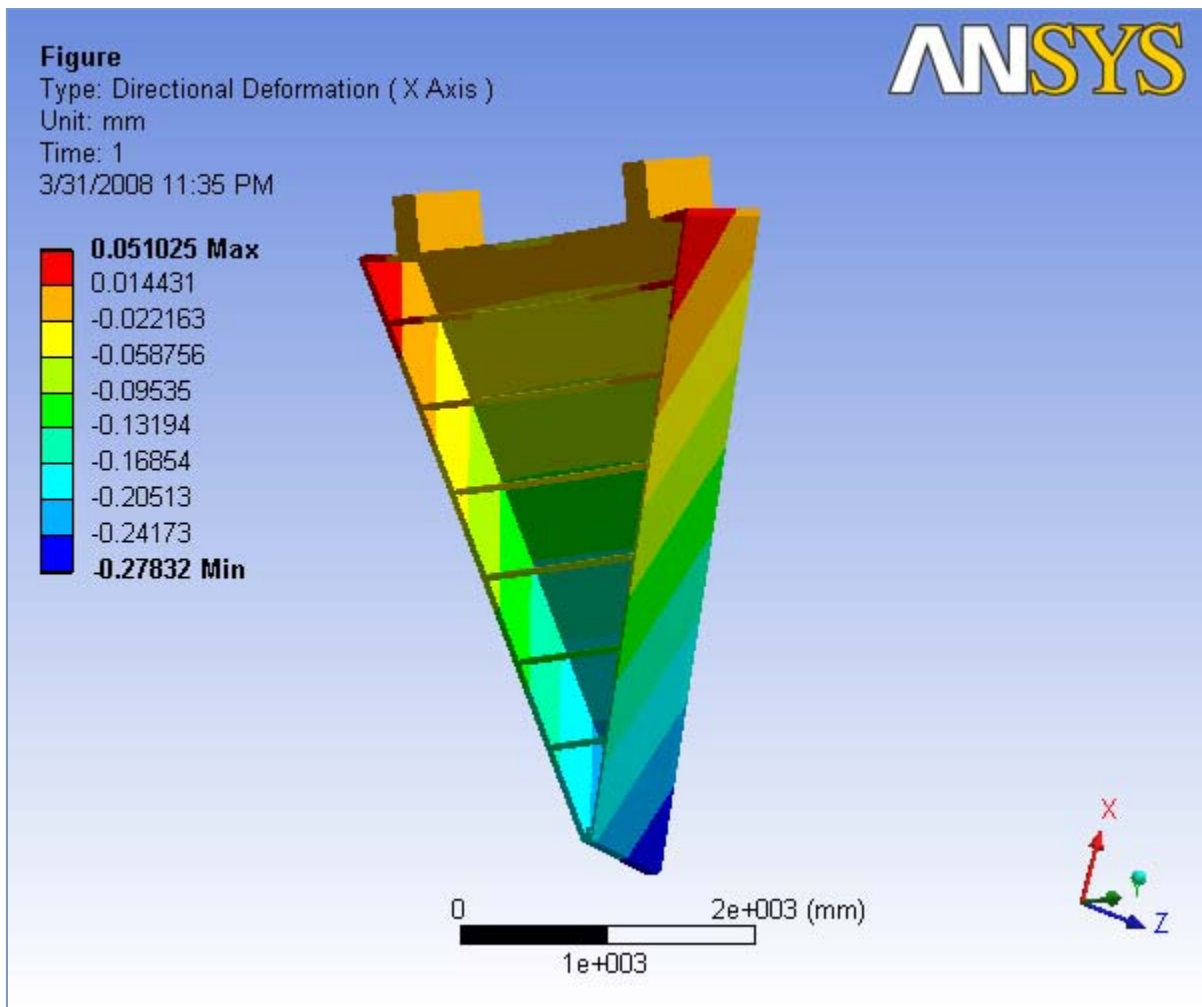


FIGURE 10
Analysis 6.1 > Static Structural > Solution > y Directional Deformation > Figure

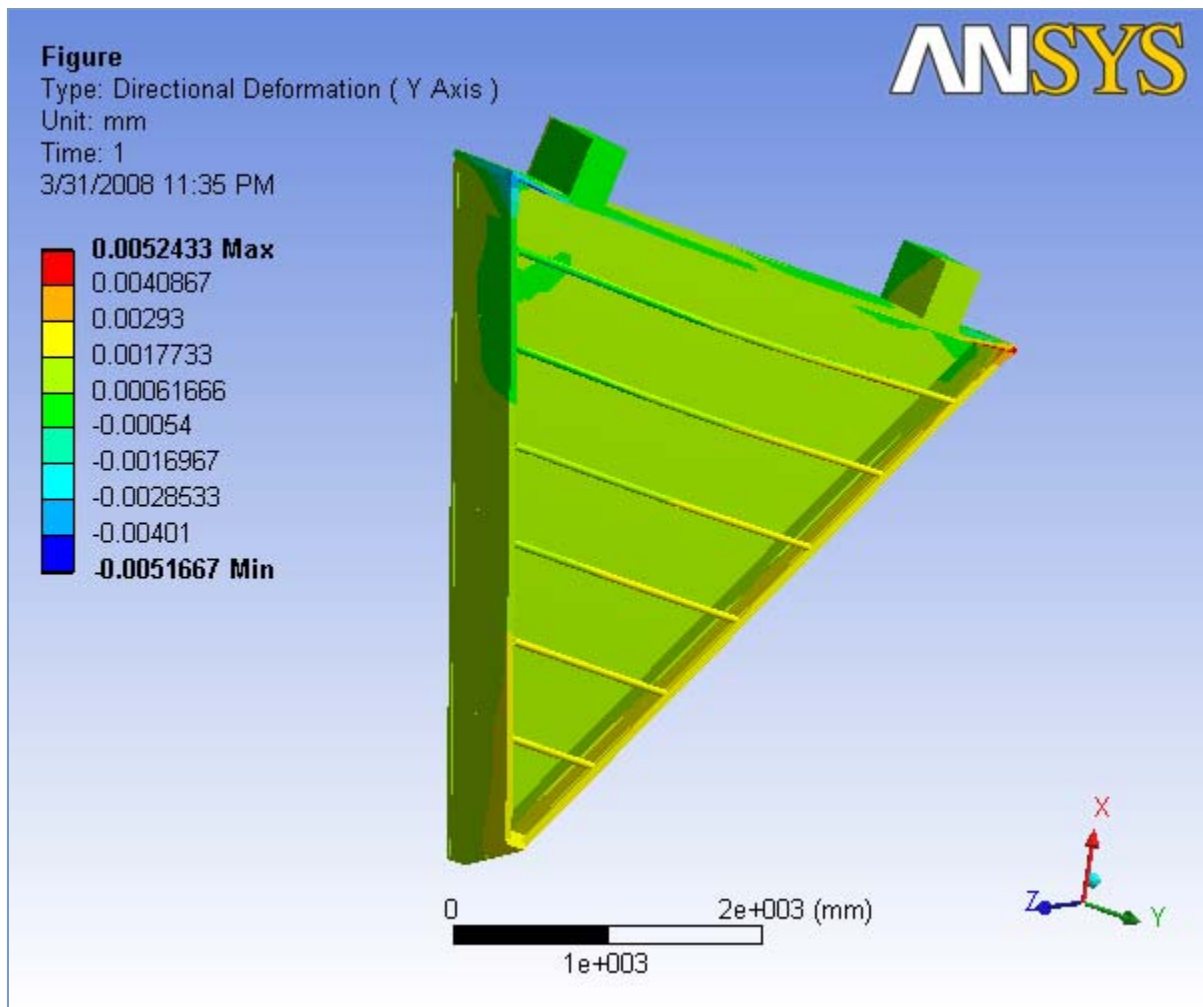
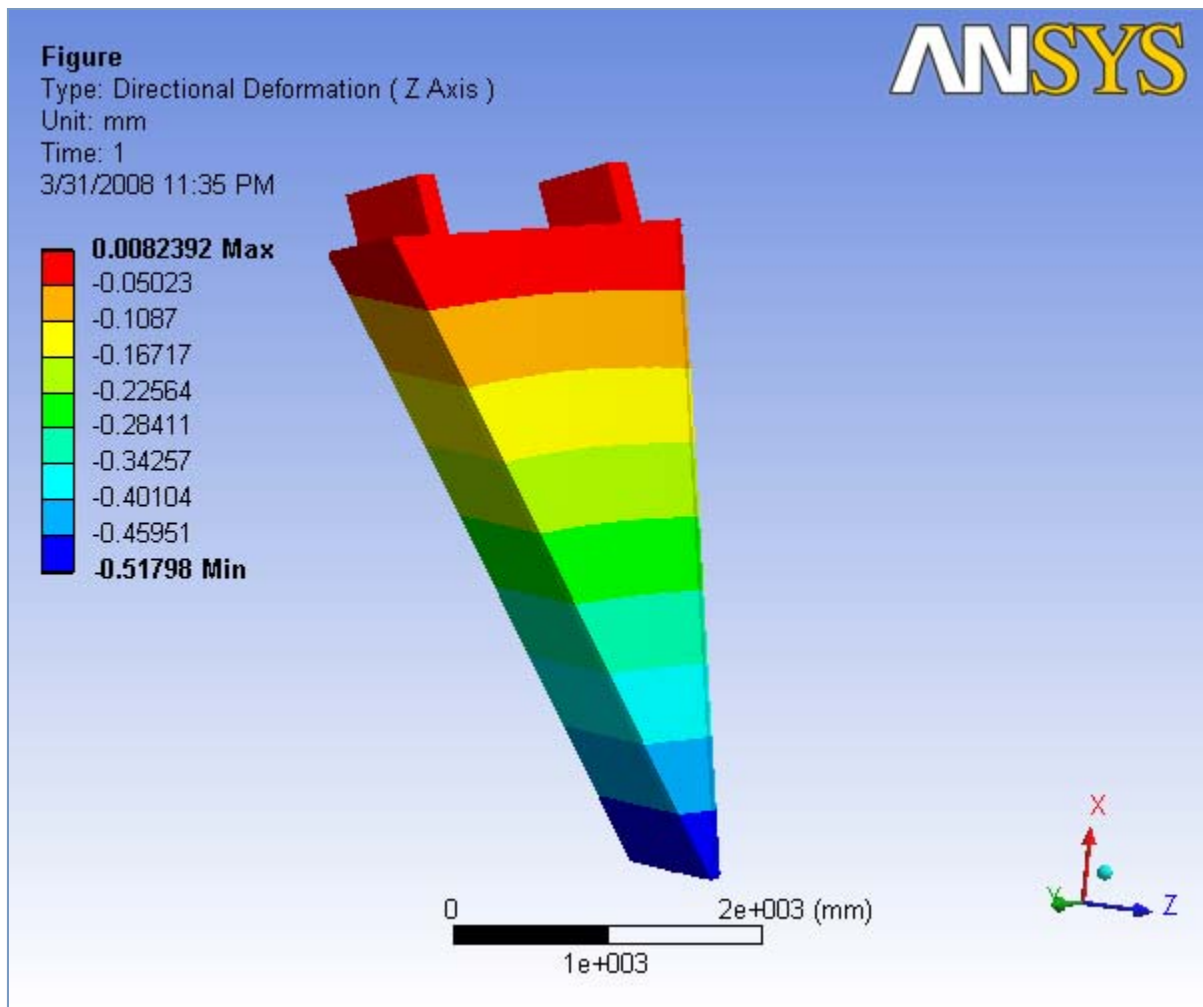


FIGURE 11
Analysis 6.1 > Static Structural > Solution > z Directional Deformation > Figure



Material Data

Polyurethane

TABLE 27
Polyurethane > Constants

Structural	
Young's Modulus	9751.9 MPa
Poisson's Ratio	0.
Density	2.4e-007 kg/mm ³
Thermal Expansion	0. 1/°C
Thermal	
Thermal Conductivity	0. W/mm·°C
Specific Heat	0. J/kg·°C
Electromagnetics	
Relative Permeability	0.
Resistivity	0. Ohm-mm

Carbon Fiber

TABLE 28

Carbon Fiber > Constants

Structural	
Young's Modulus	1.5e+005 MPa
Poisson's Ratio	0.
Density	5.8e-007 kg/mm ³
Thermal Expansion	0. 1/°C
Thermal	
Thermal Conductivity	0. W/mm·°C
Specific Heat	0. J/kg·°C
Electromagnetics	
Relative Permeability	0.
Resistivity	0. Ohm·mm

Hexcel sheet

TABLE 29
Hexcel sheet > Constants

Structural	
Young's Modulus	1.4805e+005 MPa
Poisson's Ratio	0.
Density	2.8833e-008 kg/mm ³
Thermal Expansion	0. 1/°C
Thermal	
Thermal Conductivity	0. W/mm·°C
Specific Heat	0. J/kg·°C
Electromagnetics	
Relative Permeability	0.
Resistivity	0. Ohm·mm

Structural Steel

TABLE 30
Structural Steel > Constants

Structural	
Young's Modulus	2.e+005 MPa
Poisson's Ratio	0.3
Density	7.85e-006 kg/mm ³
Thermal Expansion	1.2e-005 1/°C
Tensile Yield Strength	250. MPa
Compressive Yield Strength	250. MPa
Tensile Ultimate Strength	460. MPa
Compressive Ultimate Strength	0. MPa
Thermal	
Thermal Conductivity	6.05e-002 W/mm·°C
Specific Heat	434. J/kg·°C
Electromagnetics	
Relative Permeability	10000
Resistivity	1.7e-004 Ohm·mm

FIGURE 12
Structural Steel > Alternating Stress

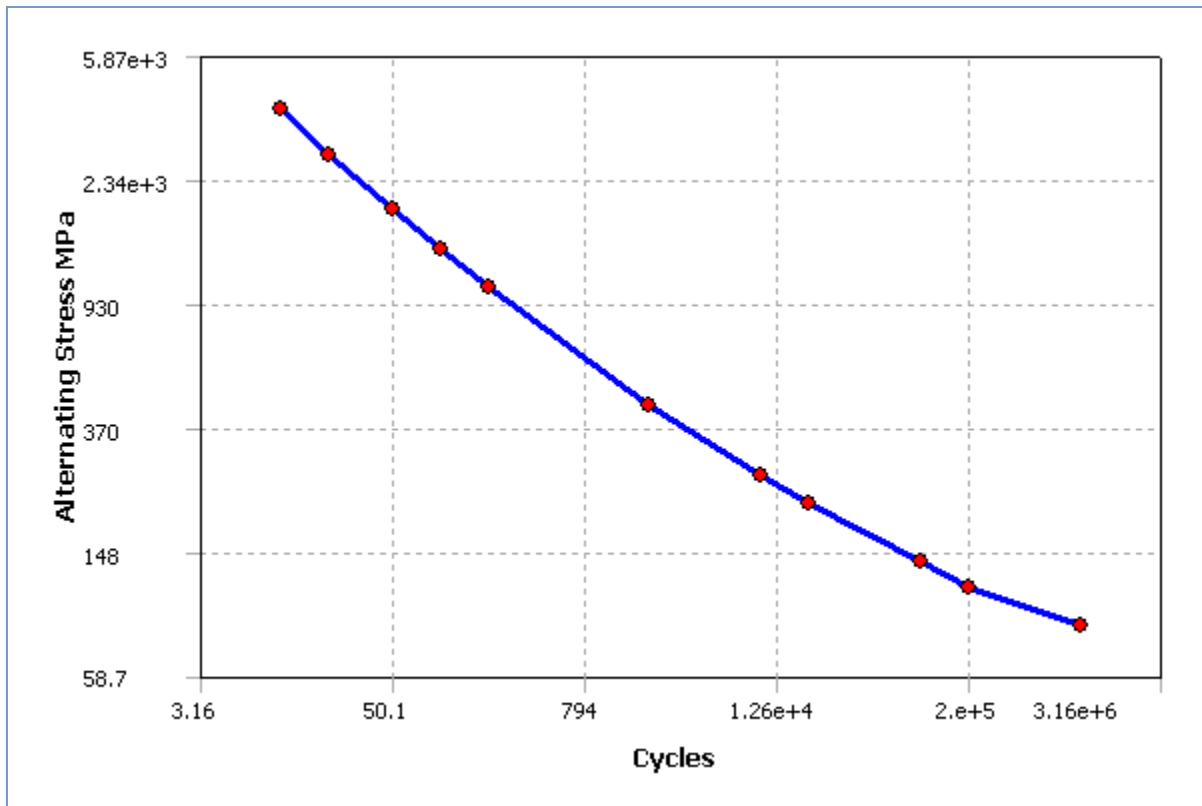


TABLE 31
Structural Steel > Alternating Stress > Property Attributes

Interpolation	Log-Log
Mean Curve Type	Mean Stress

TABLE 32
Structural Steel > Alternating Stress > Alternating Stress Curve Data

Mean Value MPa
0.

TABLE 33
Structural Steel > Alternating Stress > Alternating Stress vs. Cycles

Cycles	Alternating Stress MPa
10.	3999.
20.	2827.
50.	1896.
100.	1413.
200.	1069.
2000.	441.
10000	262.
20000	214.
1.e+005	138.
2.e+005	114.
1.e+006	86.2

FIGURE 13
Structural Steel > Strain-Life Parameters

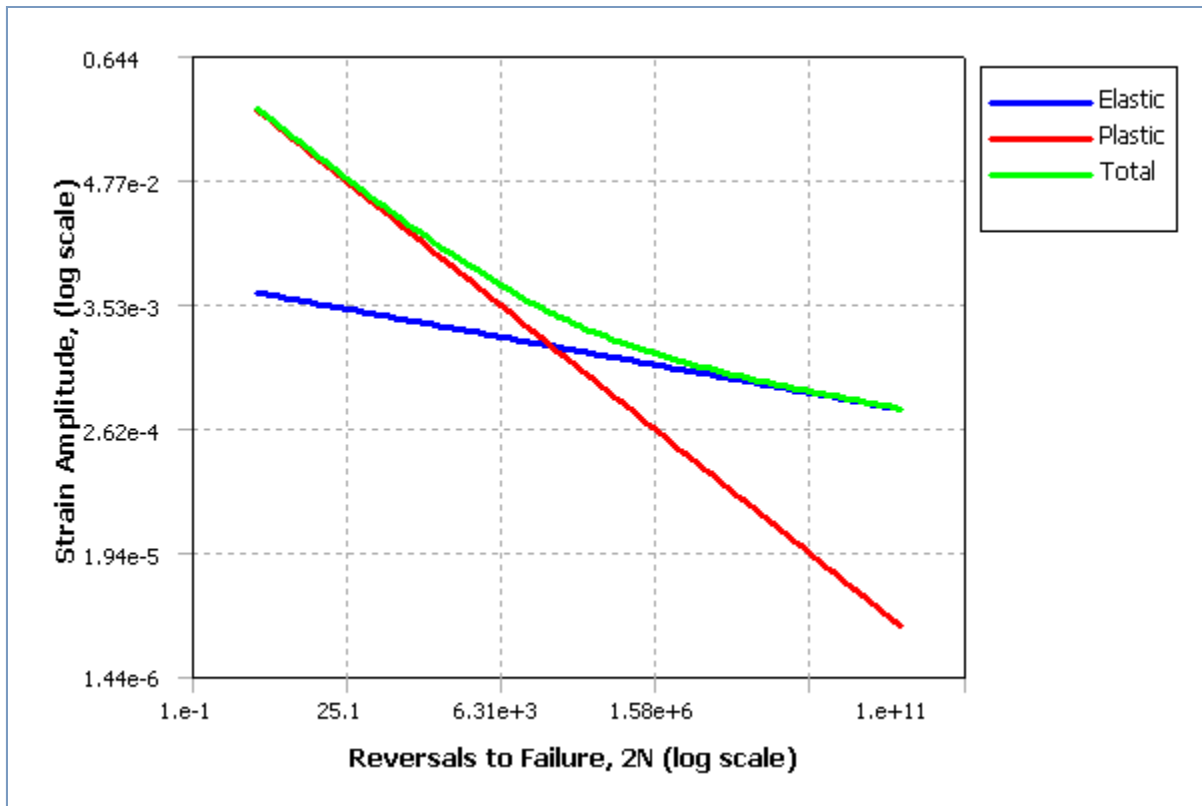


TABLE 34
Structural Steel > Strain-Life Parameters > Property Attributes
 Display Curve Type Strain-Life

TABLE 35
Structural Steel > Strain-Life Parameters > Strain-Life Parameters

Strength Coefficient MPa	920.
Strength Exponent	-0.106
Ductility Coefficient	0.213
Ductility Exponent	-0.47
Cyclic Strength Coefficient MPa	1000.
Cyclic Strain Hardening Exponent	0.2