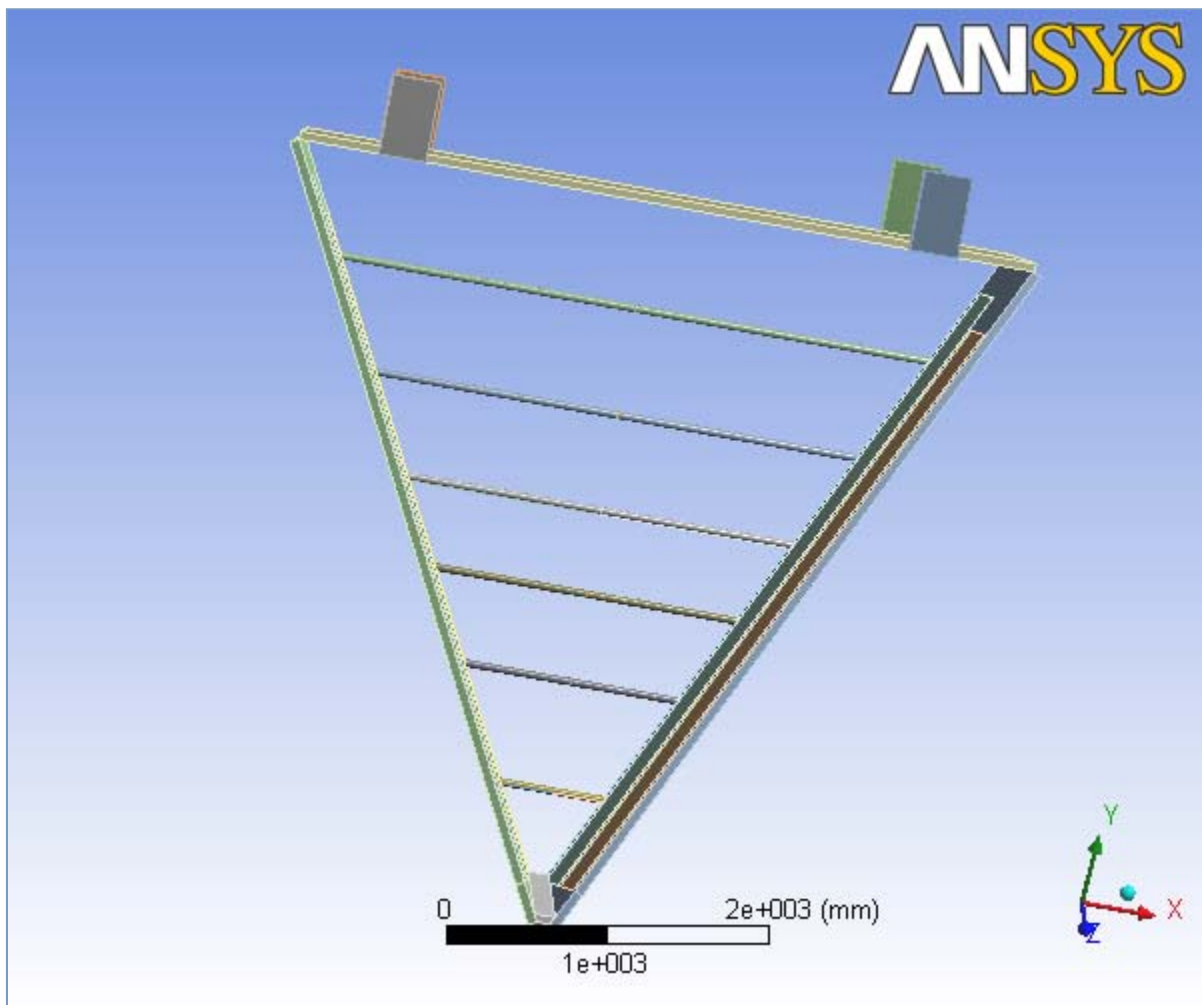




R3 Drift Chamber

<i>Author</i>	<i>Kalyan Jinnuri</i>
<i>Subject</i>	<i>All materials made of Polyurethane with Wire loading, gravity and carbon rods - Constraint case 2</i>
<i>First Saved</i>	<i>Wednesday, January 23, 2008</i>
<i>Last Saved</i>	<i>Wednesday, January 23, 2008</i>
<i>Product Version</i>	<i>11.0 Release</i>



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Units

TABLE 1

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

Analysis 3.3

Geometry

TABLE 2
Analysis 3.3 > Geometry

Object Name	<i>Geometry</i>
State	Fully Defined
Definition	
Source	C:\Documents and Settings\Jinnuri\Desktop\website\full2\ful2.agdb
Type	DesignModeler
Length Unit	Millimeters
Element Control	Program Controlled
Display Style	Part Color
Bounding Box	
Length X	4770.1 mm
Length Y	4526.2 mm
Length Z	2869.2 mm
Properties	
Volume	5.0979e+008 mm ³
Mass	130.43 kg
Statistics	
Bodies	31

Active Bodies	31
Nodes	221573
Elements	84427
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 3.3 > Geometry > Parts

Object Name	Nose	End plate 1	End Plate 2	hole area big 1	hole area small 1
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Material	Polyurethane				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
Bounding Box					
Length X	180.6 mm	2344.4 mm		2046.5 mm	2159.8 mm
Length Y	102.32 mm	4003.3 mm		3487.3 mm	3683.7 mm
Length Z	614. mm	2637. mm		2017.5 mm	2122.9 mm
Properties					
Volume	8.1265e+006 mm³	4.6506e+007 mm³		5.5389e+007 mm³	5.861e+007 mm³
Mass	1.9504 kg	11.161 kg		13.293 kg	14.066 kg
Centroid X	3.0561e-015 mm	1319.1 mm	-1312.8 mm	1128.1 mm	1129.1 mm
Centroid Y	46.196 mm	2216. mm	2205. mm	1885.1 mm	1886.8 mm
Centroid Z	305.18 mm	-833.18 mm	-860.56 mm	-529. mm	-821.16 mm
Moment of Inertia Ip1	62316 kg·mm²	3.2267e+007 kg·mm²	3.2302e+007 kg·mm²	2.0539e+007 kg·mm²	2.4327e+007 kg·mm²
Moment of Inertia Ip2	63775 kg·mm²	4.4553e+005 kg·mm²	4.7654e+005 kg·mm²	59712 kg·mm²	63184 kg·mm²

Moment of Inertia Ip3	4948.6 kg·mm ²	3.1827e+007 kg·mm ²	3.1832e+007 kg·mm ²	2.0487e+007 kg·mm ²	2.4271e+007 kg·mm ²
Statistics					
Nodes	379	1225	1230	200	
Elements	151	109		16	

TABLE 4
Analysis 3.3 > Geometry > Parts

Object Name	<i>hole area short 2</i>	<i>hole area long 2</i>	<i>back plate</i>	<i>slider hinge 1</i>	<i>slider hinge 2</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	2046.5 mm	2159.8 mm	4680.1 mm	300. mm	
Length Y	3487.3 mm	3683.7 mm	253.81 mm	482.47 mm	
Length Z	2017.5 mm	2122.9 mm	533.65 mm	233.19 mm	
Properties					
Volume	5.5389e+007 mm ³	5.861e+007 mm ³	1.2688e+008 mm ³	7.5e+006 mm ³	
Mass	13.293 kg	14.066 kg	30.452 kg	1.8 kg	
Centroid X	-1074.5 mm	-1184.7 mm	9.6892 mm	-1685.5 mm	1694.7 mm
Centroid Y	1792.3 mm	1983.3 mm	3954. mm	4274.9 mm	
Centroid Z	-759.38 mm	-581.71 mm	-1771.8 mm	-1577.3 mm	
Moment of Inertia Ip1	2.0539e+007 kg·mm ²	2.4327e+007 kg·mm ²	7.8835e+005 kg·mm ²	37875 kg·mm ²	
Moment of Inertia Ip2	59712 kg·mm ²	63184 kg·mm ²	5.3832e+007 kg·mm ²	13875 kg·mm ²	
Moment of Inertia Ip3	2.0487e+007 kg·mm ²	2.4271e+007 kg·mm ²	5.3056e+007 kg·mm ²	51000 kg·mm ²	
Statistics					
Nodes	200		336	254	
Elements	16		34	28	

TABLE 5
Analysis 3.3 > Geometry > Parts

Object Name	<i>slider hinge 3</i>	<i>slider hinge 4</i>	<i>ball joint area</i>	<i>carbon rod 1</i>	<i>carbon rod 2</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	300. mm	10. mm	679.59 mm	1370.8 mm
Length Y	482.47 mm	10. mm	41.264 mm	48. mm
Length Z	233.19 mm	10. mm	48. mm	
Properties				
Volume	7.5e+006 mm³	272.69 mm³	1.9112e+005 mm³	2.5612e+005 mm³
Mass	1.8 kg	6.5446e-005 kg	0.11085 kg	0.14855 kg
Centroid X	1595.7 mm	-1565.9 mm	0.25 mm	-9.8728e-004 mm
Centroid Y	4048.8 mm		-2.6037 mm	566.58 mm
Centroid Z	-2138.6 mm		307. mm	-258.97 mm
Moment of Inertia Ip1	37875 kg·mm²		4.9643e-004 kg·mm²	29.672 kg·mm²
Moment of Inertia Ip2	13875 kg·mm²		4103.3 kg·mm²	22124 kg·mm²
Moment of Inertia Ip3	51000 kg·mm²		4084.8 kg·mm²	22124 kg·mm²
Statistics				
Nodes	254	412	706	11732
Elements	28	180	104	1666

TABLE 6
Analysis 3.3 > Geometry > Parts

Object Name	carbon rod 3	carbon rod 4	carbon rod 5	carbon rod 6	Solid
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Material	Carbon Fiber				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
Bounding Box					
Length X	1937.5 mm	2470.4 mm	3082.6 mm	3760.9 mm	336.97 mm
Length Y	48. mm	47.509 mm	48. mm		43.109 mm
Length Z	48. mm	46.695 mm	48. mm		45.236 mm
Properties					
Volume	3.6419e+005 mm³	6.0063e+005 mm³	5.8256e+005 mm³	7.1191e+005 mm³	4.9426e+005 mm³
Mass	0.21123 kg	0.34836 kg	0.33789 kg	0.41291 kg	0.28667 kg
Centroid X	-7.9857e-010 mm	8.7038e-002 mm	-2.7438e-010 mm	3.3584e-008 mm	162.27 mm
Centroid Y	1642.5 mm	2113.4 mm	2634.2 mm	3221.6 mm	550.71 mm
Centroid Z	-838.2 mm	-1074.2 mm	-1367.3 mm	-1684.9 mm	-252.64 mm
Moment of Inertia Ip1	112.58 kg·mm²	101.09 kg·mm²	180.1 kg·mm²	220.08 kg·mm²	67.791 kg·mm²
Moment of Inertia Ip2	63528 kg·mm²	1.7325e+005 kg·mm²	2.5985e+005 kg·mm²	4.7413e+005 kg·mm²	2525.2 kg·mm²
Moment of Inertia	63528 kg·mm²	1.7331e+005	2.5985e+005	4.7413e+005	2521. kg·mm²

Ip3		kg-mm ²	kg-mm ²	kg-mm ²	
Statistics					
Nodes	12240	521	13560	147398	445
Elements	1740	72	1930	72550	80

TABLE 7
Analysis 3.3 > Geometry > Parts

Object Name	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Material	Carbon Fiber				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
Bounding Box					
Length X	684.64 mm	967.98 mm	1233.4 mm	1540.5 mm	1879.7 mm
Length Y	45.4 mm		44.781 mm	45.4 mm	
Length Z	45.4 mm		44.516 mm	45.4 mm	
Properties					
Volume	1.087e+006 mm ³	1.5457e+006 mm ³	1.9096e+006 mm ³	2.4725e+006 mm ³	3.0215e+006 mm ³
Mass	0.63048 kg	0.89649 kg	1.1076 kg	1.4341 kg	1.7525 kg
Centroid X	335.77 mm	477.43 mm	610.06 mm	763.68 mm	933.25 mm
Centroid Y	1151.7 mm	1642.4 mm	2102.5 mm	2634.1 mm	3221.5 mm
Centroid Z	-586.07 mm	-838.21 mm	-1086.5 mm	-1367.3 mm	-1684.9 mm
Moment of Inertia Ip1	158.43 kg·mm ²	225.31 kg·mm ²	269.69 kg·mm ²	360.43 kg·mm ²	440.47 kg·mm ²
Moment of Inertia Ip2	23501 kg·mm ²	67430 kg·mm ²	1.3607e+005 kg·mm ²	2.7568e+005 kg·mm ²	5.0297e+005 kg·mm ²
Moment of Inertia Ip3	23501 kg·mm ²	67431 kg·mm ²	1.3608e+005 kg·mm ²	2.7568e+005 kg·mm ²	5.0297e+005 kg·mm ²
Statistics					
Nodes	1956	2710	340	4276	5204
Elements	363	506	54	803	979

TABLE 8
Analysis 3.3 > Geometry > Parts

Object Name	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>
State	Meshed				
Graphics Properties					
Visible	Yes				
Transparency	1				
Definition					
Suppressed	No				
Material	Carbon Fiber				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				

Bounding Box					
Length X	336.97 mm	684.64 mm	967.98 mm	1233.4 mm	1540.5 mm
Length Y	43.109 mm	45.4 mm		44.781 mm	45.4 mm
Length Z	45.236 mm	45.4 mm		44.516 mm	45.4 mm
Properties					
Volume	4.9426e+005 mm³	1.087e+006 mm³	1.5457e+006 mm³	1.9096e+006 mm³	2.4725e+006 mm³
Mass	0.28667 kg	0.63048 kg	0.89649 kg	1.1076 kg	1.4341 kg
Centroid X	-162.27 mm	-335.77 mm	-477.43 mm	-610.06 mm	-763.68 mm
Centroid Y	550.71 mm	1151.7 mm	1642.4 mm	2102.5 mm	2634.1 mm
Centroid Z	-252.62 mm	-586.05 mm	-838.19 mm	-1086.5 mm	-1367.3 mm
Moment of Inertia Ip1	67.88 kg·mm²	158.43 kg·mm²	225.31 kg·mm²	269.74 kg·mm²	360.43 kg·mm²
Moment of Inertia Ip2	2526.4 kg·mm²	23501 kg·mm²	67430 kg·mm²	1.3608e+005 kg·mm²	2.7568e+005 kg·mm²
Moment of Inertia Ip3	2522.3 kg·mm²	23501 kg·mm²	67431 kg·mm²	1.3609e+005 kg·mm²	2.7568e+005 kg·mm²
Statistics					
Nodes	445	1956	2710	496	4276
Elements	80	363	506	90	803

TABLE 9
Analysis 3.3 > Geometry > Parts

Object Name	<i>Solid</i>
State	Meshed
Graphics Properties	
Visible	Yes
Transparency	1
Definition	
Suppressed	No
Material	Carbon Fiber
Stiffness Behavior	Flexible
Nonlinear Material Effects	Yes
Bounding Box	
Length X	1879.7 mm
Length Y	45.4 mm
Length Z	45.4 mm
Properties	
Volume	3.0215e+006 mm ³
Mass	1.7525 kg
Centroid X	-933.25 mm
Centroid Y	3221.5 mm
Centroid Z	-1684.9 mm
Moment of Inertia Ip1	440.47 kg·mm ²
Moment of Inertia Ip2	5.0297e+005 kg·mm ²
Moment of Inertia Ip3	5.0297e+005 kg·mm ²
Statistics	
Nodes	5204
Elements	979

Connections

TABLE 10
Analysis 3.3 > Connections

Object Name	<i>Connections</i>
State	Fully Defined
Auto Detection	
Generate Contact On Update	Yes
Tolerance Type	Slider
Tolerance Slider	0.
Tolerance Value	17.936 mm
Face/Face	Yes
Face/Edge	No
Edge/Edge	No
Priority	Include All
Same Body Grouping	Yes
Revolute Joints	Yes
Fixed Joints	Yes
Transparency	
Enabled	Yes

TABLE 11
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region	Contact Region 2	Contact Region 3	Contact Region 4	Contact Region 5
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	2 Faces		1 Face		
Target	2 Faces		1 Face		
Contact Bodies	Nose				
Target Bodies	End plate 1	End Plate 2	hole area small 1	hole area short 2	ball joint area
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 12
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 6	Contact Region 7	Contact Region 8	Contact Region 9	Contact Region 10
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	4 Faces		3 Faces	1 Face	3 Faces
Target	4 Faces		2 Faces	1 Face	2 Faces

Contact Bodies	End plate 1				
Target Bodies	hole area big 1	hole area small 1	carbon rod 1	carbon rod 2	carbon rod 3
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	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 3.3 > Connections > Contact Regions

Object Name	Contact Region 11	Contact Region 12	Contact Region 13	Contact Region 14	Contact Region 15
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	2 Faces	3 Faces		1 Face	
Target	2 Faces			1 Face	
Contact Bodies	End plate 1				
Target Bodies	carbon rod 4	carbon rod 5	carbon rod 6	Solid	
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 14
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 16	Contact Region 17	Contact Region 18	Contact Region 19	Contact Region 20
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				4 Faces
Target	1 Face				4 Faces
Contact Bodies	End plate 1				End Plate 2
Target Bodies	Solid				hole area short 2
Definition					

Type	Bonded
Scope Mode	Automatic
Behavior	Symmetric
Suppressed	No
Advanced	
Formulation	Pure Penalty
Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

TABLE 15
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 21	Contact Region 22	Contact Region 23	Contact Region 24	Contact Region 25
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	4 Faces	2 Faces	1 Face	2 Faces	1 Face
Target	4 Faces	2 Faces	1 Face	2 Faces	1 Face
Contact Bodies	End Plate 2				
Target Bodies	hole area long 2	carbon rod 1	carbon rod 2	carbon rod 3	carbon rod 4
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 16
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 26	Contact Region 27	Contact Region 28	Contact Region 29	Contact Region 30
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	2 Faces		1 Face		
Target	2 Faces		1 Face		
Contact Bodies	End Plate 2				
Target Bodies	carbon rod 5	carbon rod 6	Solid		
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				

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

TABLE 17
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 31	Contact Region 32	Contact Region 33	Contact Region 34	Contact Region 35
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	End Plate 2			hole area small 1	
Target Bodies	Solid			carbon rod 1	carbon rod 2
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 18
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 36	Contact Region 37	Contact Region 38	Contact Region 39	Contact Region 40
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	hole area small 1				
Target Bodies	carbon rod 3	carbon rod 4	carbon rod 5	carbon rod 6	Solid
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				

Normal Stiffness	Program Controlled
Update Stiffness	Never
Thermal Conductance	Program Controlled
Pinball Region	Program Controlled

TABLE 19
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 41	Contact Region 42	Contact Region 43	Contact Region 44	Contact Region 45
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	hole area small 1				
Target Bodies	Solid				
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 20
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 46	Contact Region 47	Contact Region 48	Contact Region 49	Contact Region 50
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	hole area short 2				
Target Bodies	carbon rod 1	carbon rod 3	carbon rod 4	carbon rod 5	carbon rod 6
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				

Pinball Region

Program Controlled

TABLE 21
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 51	Contact Region 52	Contact Region 53	Contact Region 54	Contact Region 55
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	hole area short 2				
Target Bodies	Solid				
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 22
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 56	Contact Region 57	Contact Region 58	Contact Region 59	Contact Region 60
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	back plate				carbon rod 1
Target Bodies	slider hinge 1	slider hinge 2	slider hinge 3	slider hinge 4	Solid
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 23
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 61	Contact Region 62	Contact Region 63	Contact Region 64	Contact Region 65
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	carbon rod 1	carbon rod 2		carbon rod 3	
Target Bodies	Solid				
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 24
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 66	Contact Region 67	Contact Region 68	Contact Region 69	Contact Region 70
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	carbon rod 4		carbon rod 5		carbon rod 6
Target Bodies	Solid				
Definition					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

TABLE 25
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 71	Contact Region 72	Contact Region 73	Contact Region 74	Contact Region 75
State	Fully Defined				
Scope					

Scoping Method	Geometry Selection	
Contact	1 Face	
Target	1 Face	
Contact Bodies	carbon rod 6	Solid
Target Bodies	Solid	
Definition		
Type	Bonded	
Scope Mode	Automatic	
Behavior	Symmetric	
Suppressed	No	
Advanced		
Formulation	Pure Penalty	
Normal Stiffness	Program Controlled	
Update Stiffness	Never	
Thermal Conductance	Program Controlled	
Pinball Region	Program Controlled	

TABLE 26
Analysis 3.3 > Connections > Contact Regions

Object Name	Contact Region 76	Contact Region 77	Bonded - End Plate 2 To back plate		Bonded - End plate 1 To back plate
State	Fully Defined				
Scope					
Scoping Method	Geometry Selection				
Contact	1 Face				
Target	1 Face				
Contact Bodies	Solid		End Plate 2	End plate 1	
Target Bodies	Solid		back plate		
Definition					
Type	Bonded				
Scope Mode	Automatic		Manual		
Behavior	Symmetric				
Suppressed	No				
Advanced					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

Mesh

TABLE 27
Analysis 3.3 > 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	221573
Elements	84427

Static Structural

TABLE 28
Analysis 3.3 > Analysis

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

TABLE 29
Analysis 3.3 > 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\full2\ful2 Simulation Files\Static Structural\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

TABLE 30
Analysis 3.3 > Static Structural > Accelerations

Object Name	<i>Standard Earth Gravity</i>
State	Fully Defined
Scope	
Geometry	All Bodies
Definition	
X Component	0. mm/s ² (ramped)
Y Component	-9806.6 mm/s ² (ramped)
Z Component	0. mm/s ² (ramped)
Suppressed	No
Direction	-Y Direction

FIGURE 1
Analysis 3.3 > Static Structural > Standard Earth Gravity



TABLE 31
Analysis 3.3 > Static Structural > Loads

Object Name	Force	Force 2	Force 3	Force 4	Fixed Support
State	Fully Defined				
Scope					

Scoping Method	Geometry Selection				
Geometry	1 Face				2 Faces
Definition					
Define By	Components				
Type	Force				Fixed Support
X Component	-1504.1 N (ramped)		1504.1 N (ramped)		
Y Component	-158.08 N (ramped)	158.08 N (ramped)	-158.08 N (ramped)	158.08 N (ramped)	
Z Component	0. N (ramped)				
Suppressed	No				

FIGURE 2
Analysis 3.3 > Static Structural > Force

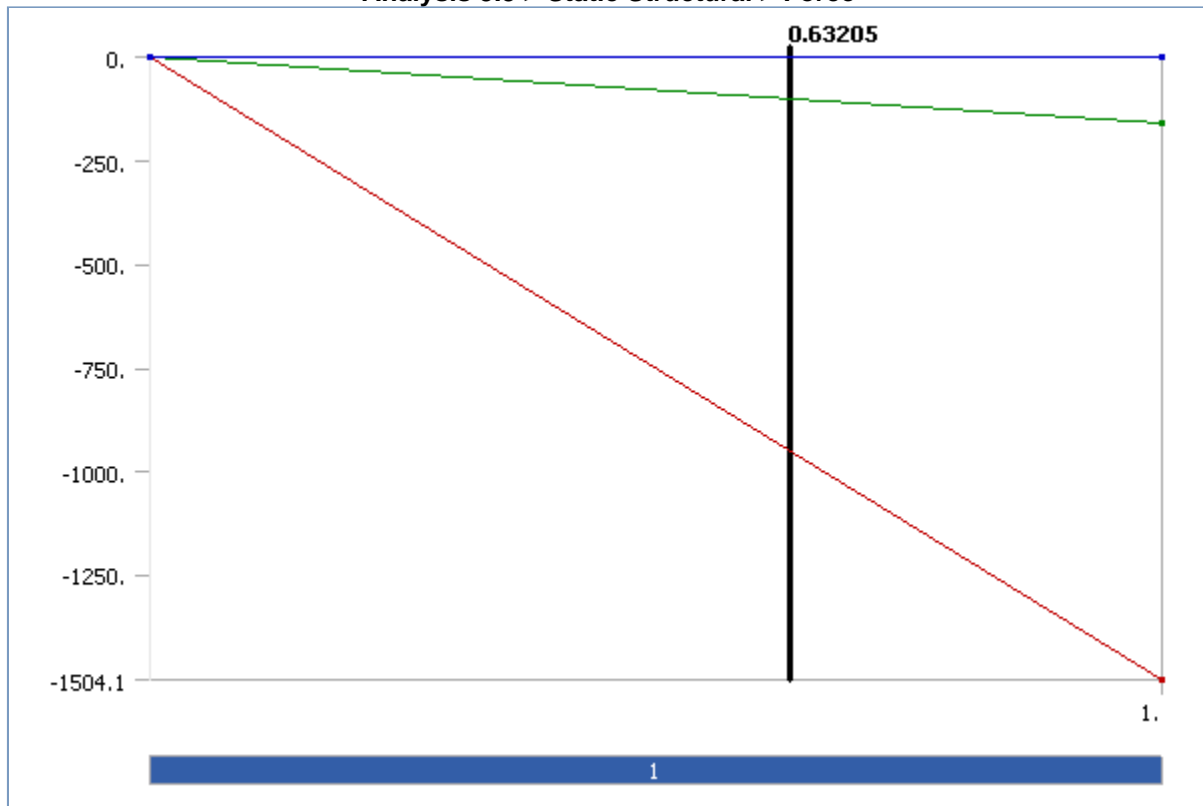


FIGURE 3
Analysis 3.3 > Static Structural > Force 2

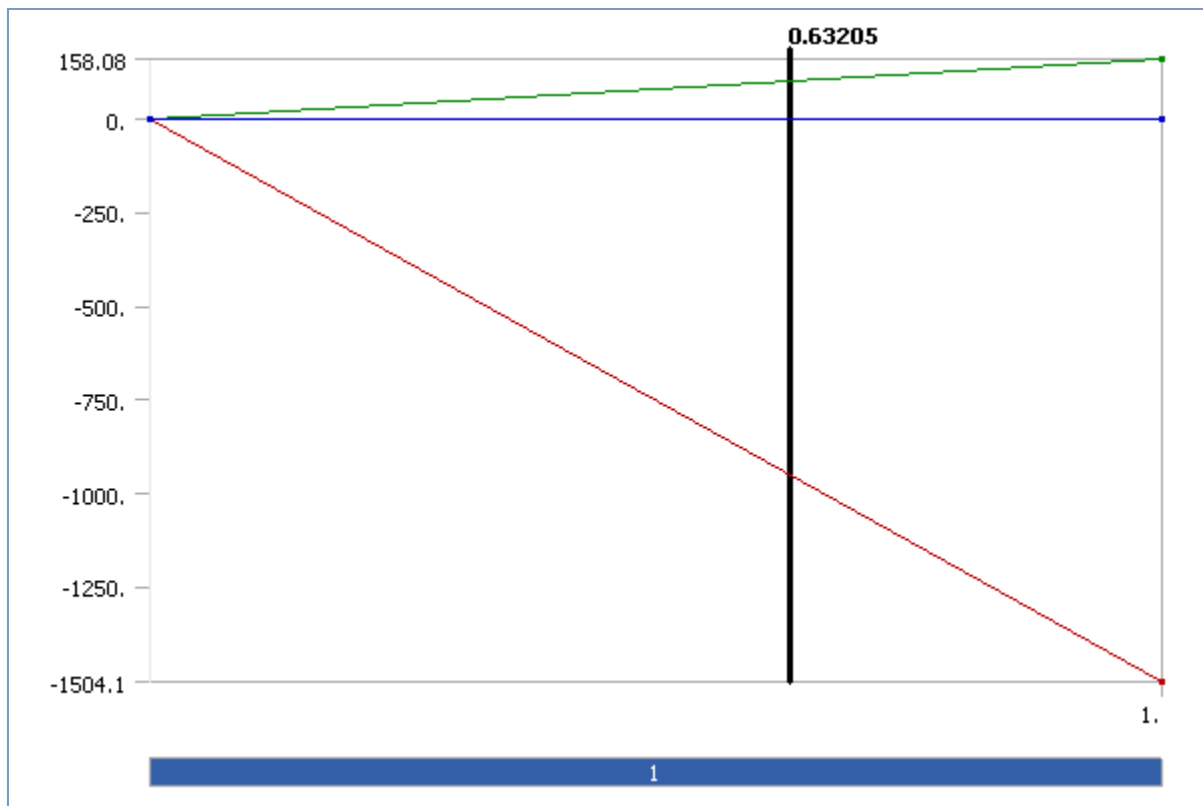


FIGURE 4
Analysis 3.3 > Static Structural > Force 3

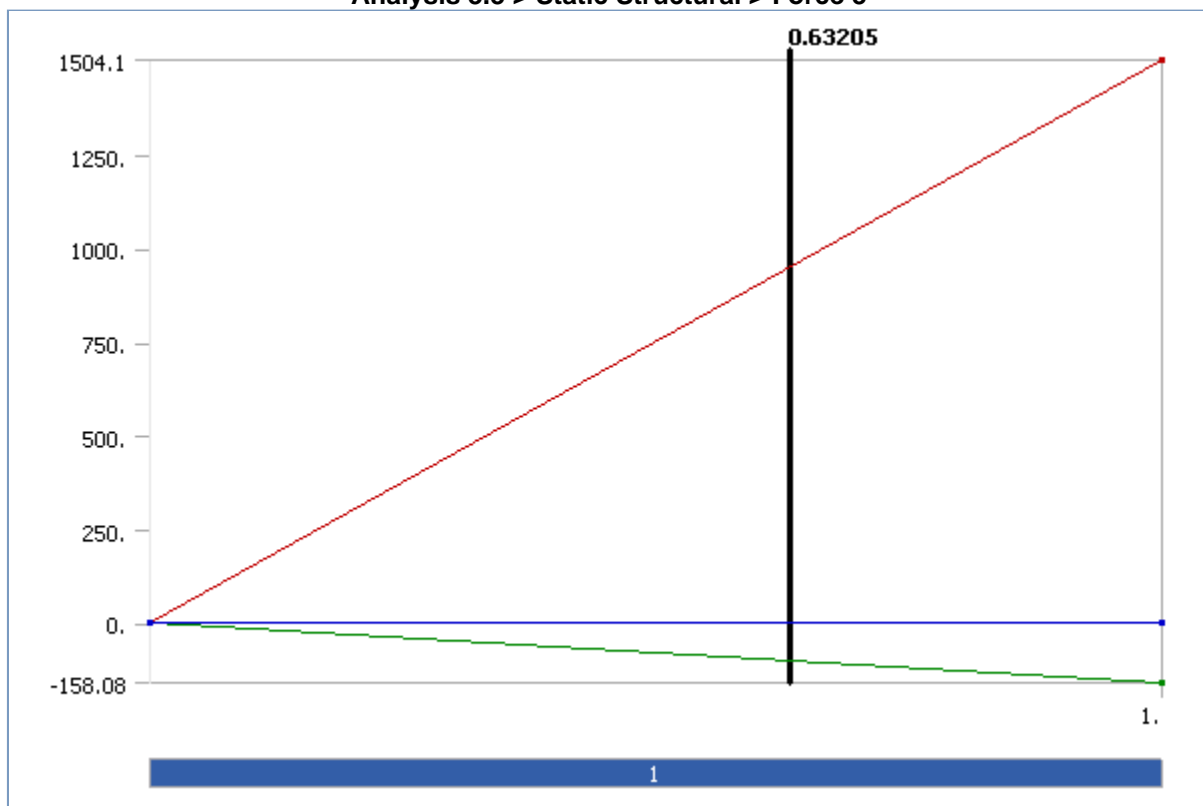


FIGURE 5
Analysis 3.3 > Static Structural > Force 4

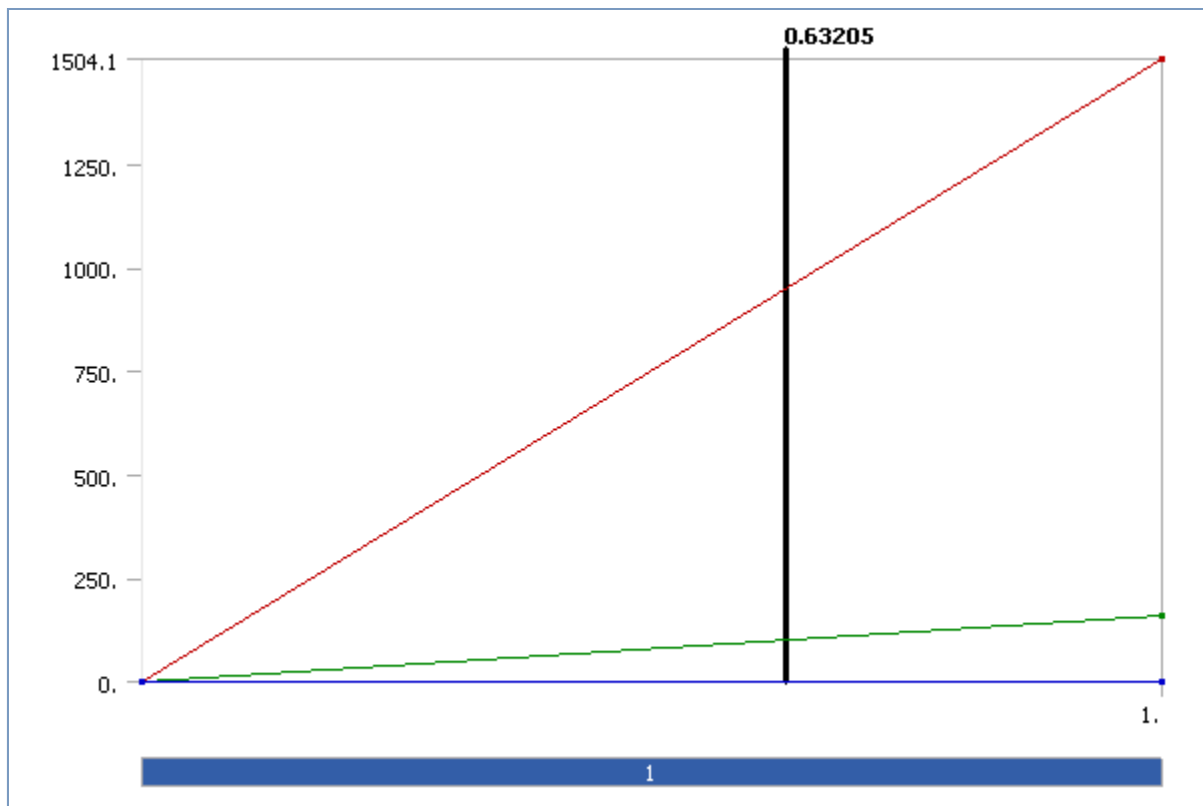


TABLE 32
Analysis 3.3 > Static Structural > Loads

Object Name	Displacement	Fixed Support 2
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	2 Faces	1 Face
Definition		
Define By	Components	
Type	Displacement	Fixed Support
X Component	Free	
Y Component	0. mm (ramped)	
Z Component	0. mm (ramped)	
Suppressed	No	

FIGURE 6
Analysis 3.3 > Static Structural > Displacement



Solution

TABLE 33
Analysis 3.3 > Static Structural > Solution

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

TABLE 34
Analysis 3.3 > 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 35
Analysis 3.3 > Static Structural > Solution > Results

Object Name	Total Deformation	Directional Deformation	Directional Deformation 2	Directional Deformation 3
State	Solved			
Scope				
Geometry	All Bodies			
Definition				

Type	Total Deformation	Directional Deformation		
Display Time	End Time			
Orientation		X Axis	Y Axis	Z Axis
Results				
Minimum	0. mm	-0.79317 mm	-0.71524 mm	-0.79617 mm
Maximum	1.038 mm	0.96923 mm	0.36193 mm	0.10179 mm
Minimum Occurs On	slider hinge 1	End plate 1	carbon rod 5	carbon rod 4
Maximum Occurs On	carbon rod 4	End Plate 2		
Information				
Time	1. s			
Load Step	1			
Substep	1			
Iteration Number	1			

FIGURE 7
Analysis 3.3 > Static Structural > Solution > Total Deformation > Figure

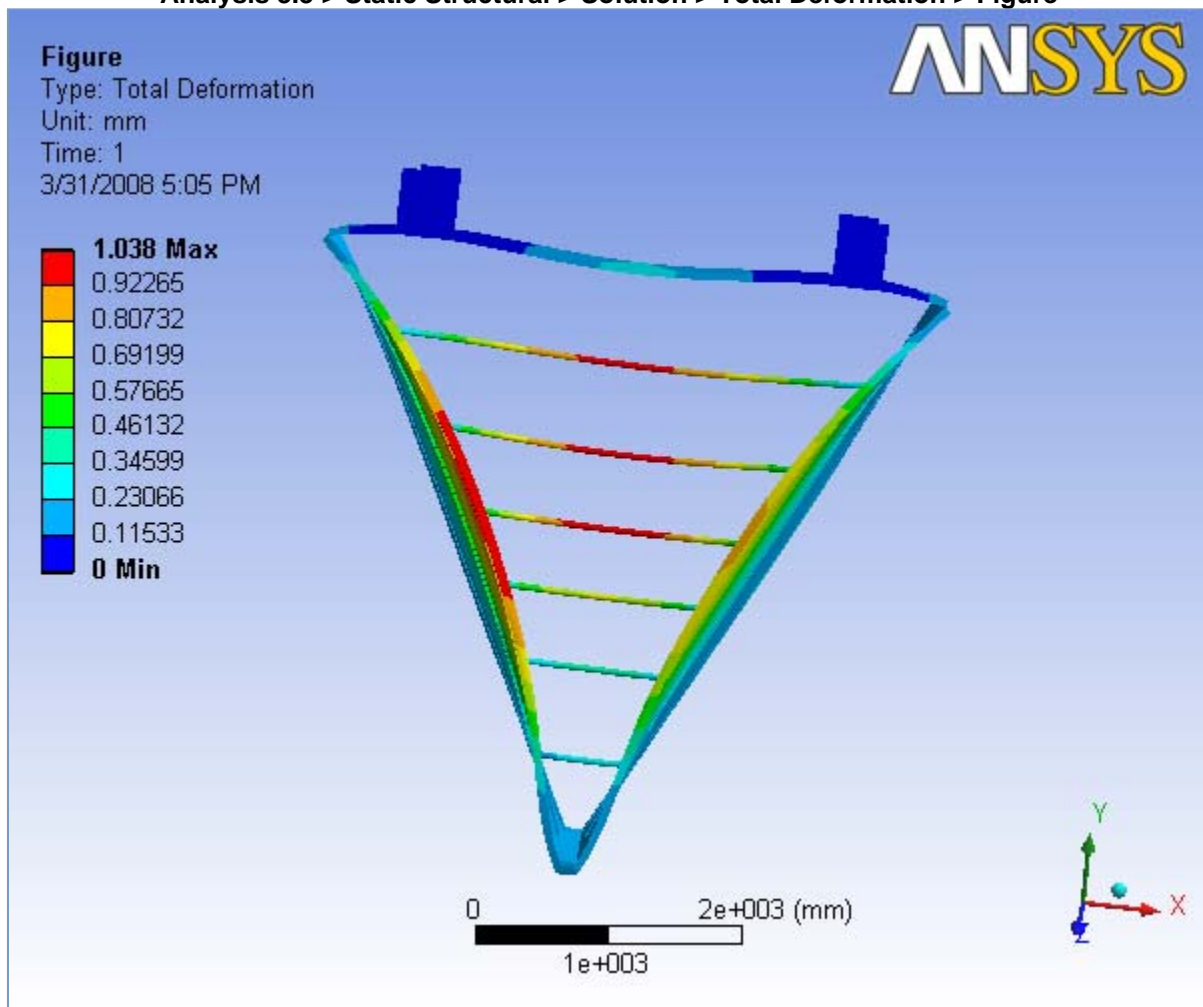


FIGURE 8
Analysis 3.3 > Static Structural > Solution > Directional Deformation > Figure

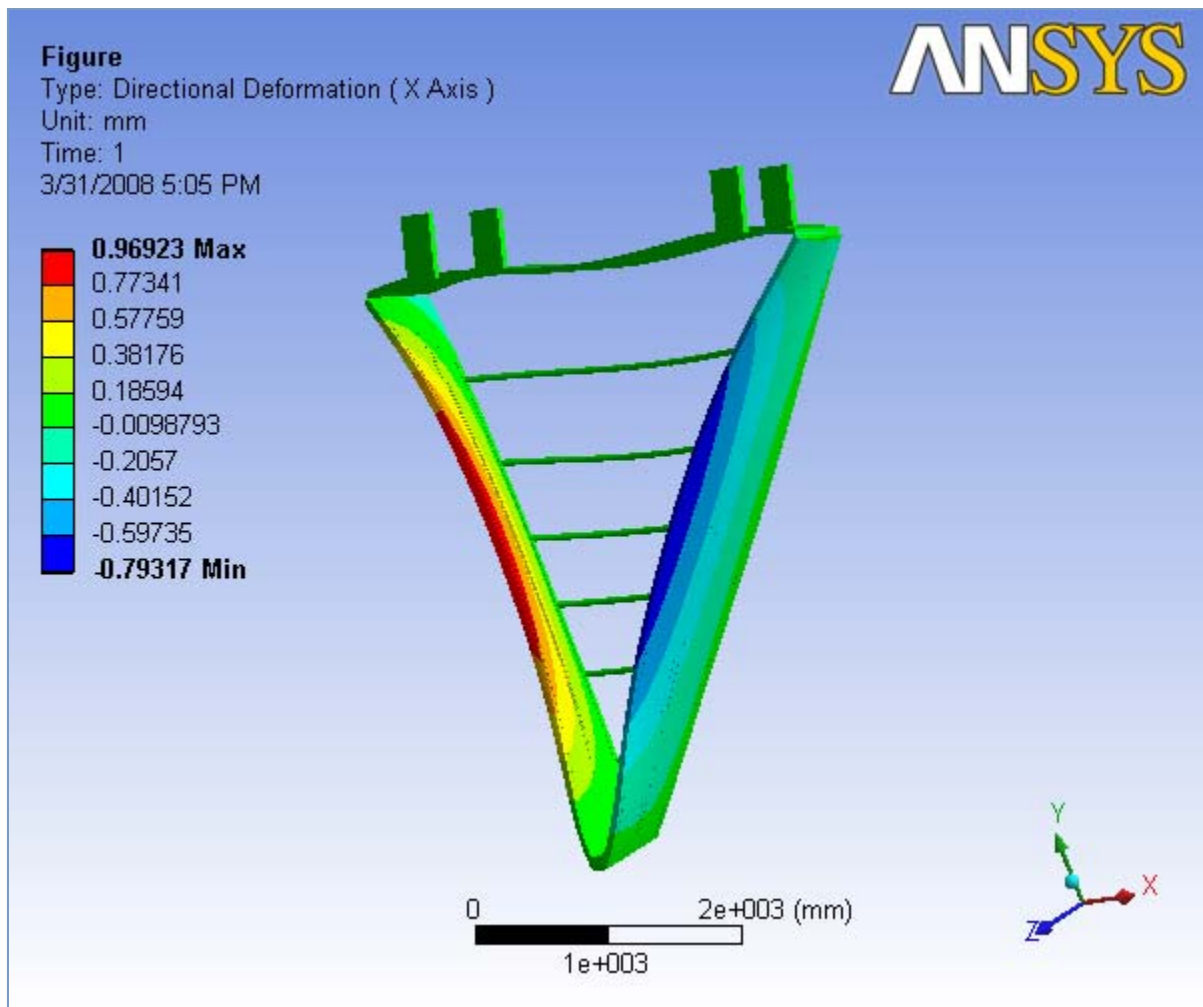


FIGURE 9
Analysis 3.3 > Static Structural > Solution > Directional Deformation 2 > Figure

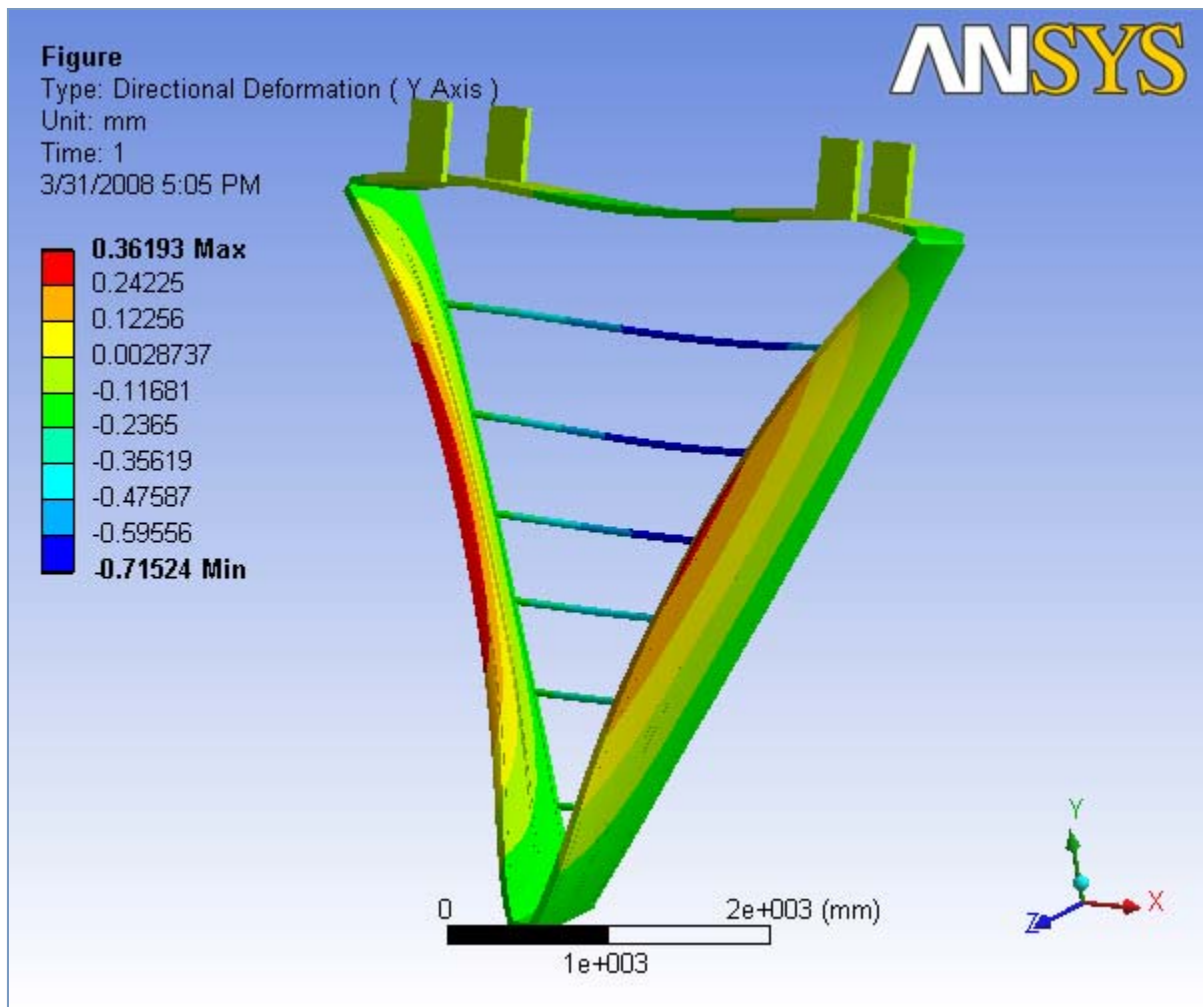
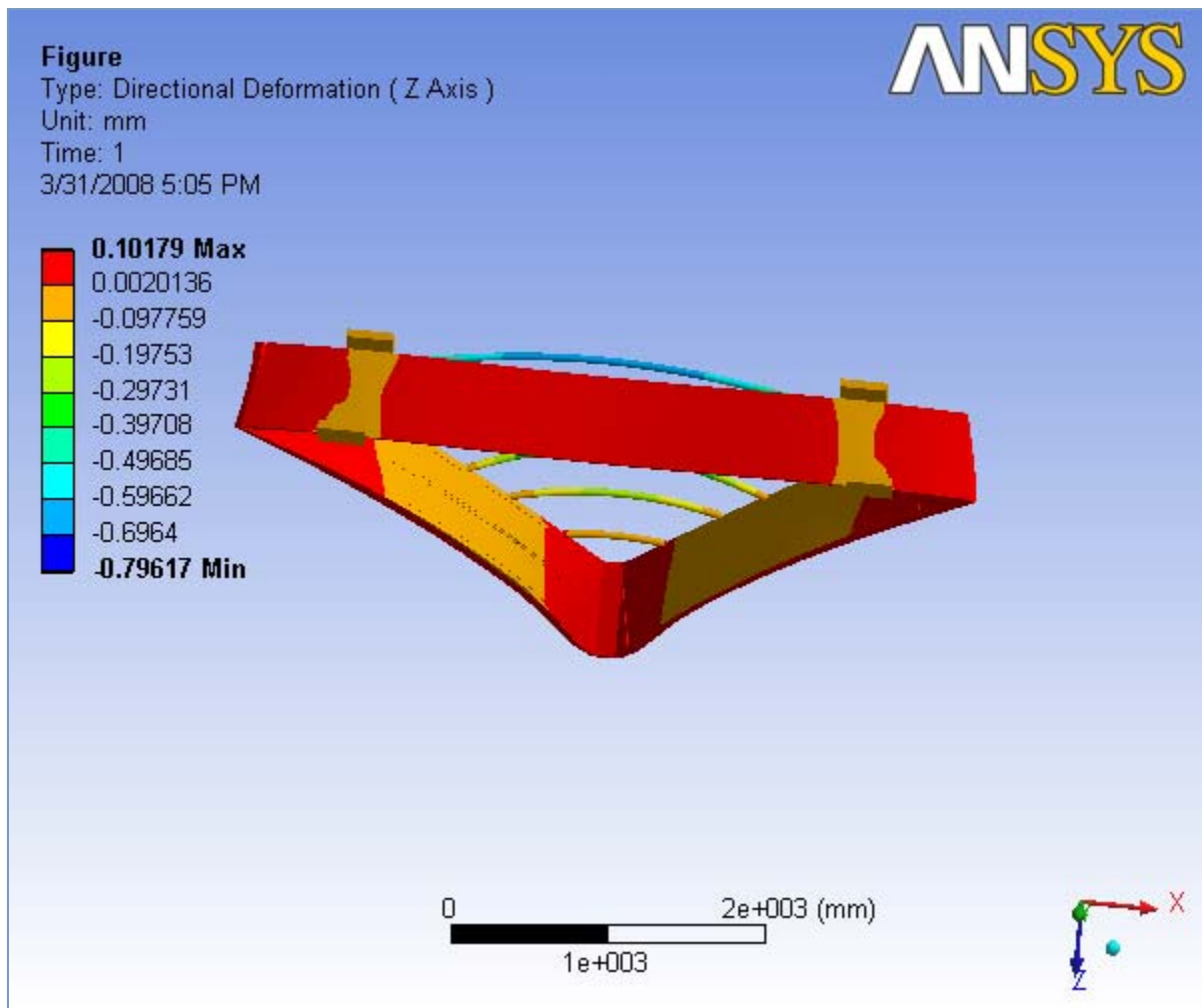


FIGURE 10
Analysis 3.3 > Static Structural > Solution > Directional Deformation 3 > Figure



Material Data

Polyurethane

TABLE 36
Polyurethane > Constants

Structural	
Young's Modulus	9751.9 MPa
Poisson's Ratio	0.3
Density	2.4e-007 kg/mm ³
Thermal Expansion	1.2e-005 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 37

Carbon Fiber > Constants

Structural	
Young's Modulus	1.5e+005 MPa
Poisson's Ratio	0.3
Density	5.8e-007 kg/mm ³
Thermal Expansion	1.2e-005 1/°C
Thermal	
Thermal Conductivity	0. W/mm·°C
Specific Heat	0. J/kg·°C
Electromagnetics	
Relative Permeability	0.
Resistivity	0. Ohm·mm