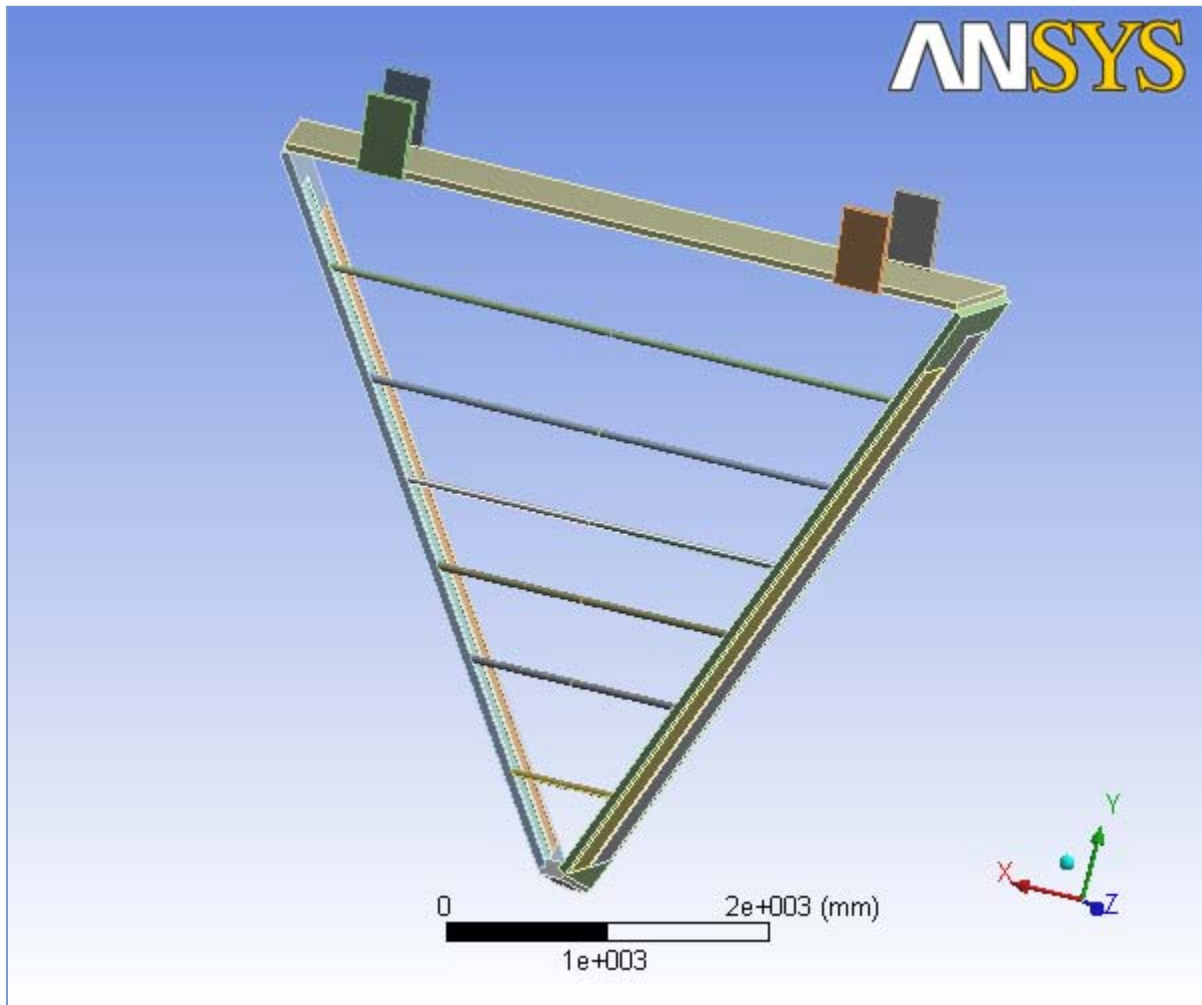




## ***DRIFT CHAMBER R3 PRIMARY ANALYSIS***

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# Units

**TABLE 1**

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

# Analysis 3.1

## Geometry

**TABLE 2**  
**Analysis 3.1 > Geometry**

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

Active Bodies	31
Nodes	221573
Elements	84427
<b>Preferences</b>	
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 3.1 > Geometry > Parts**

Object Name	<i>Nose</i>	<i>End plate 1</i>	<i>End Plate 2</i>	<i>hole area big 1</i>	<i>hole area small 1</i>
State	Meshed				
<b>Graphics Properties</b>					
Visible	Yes				
Transparency	1				
<b>Definition</b>					
Suppressed	No				
Material	Polyurethane				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
<b>Bounding Box</b>					
Length X	180.6 mm	2344.4 mm	2046.5 mm	2159.8 mm	2159.8 mm
Length Y	102.32 mm	4003.3 mm	3487.3 mm	3683.7 mm	3683.7 mm
Length Z	614. mm	2637. mm	2017.5 mm	2122.9 mm	2122.9 mm
<b>Properties</b>					
Volume	8.1265e+006 mm <sup>3</sup>	4.6506e+007 mm <sup>3</sup>		5.5389e+007 mm <sup>3</sup>	5.861e+007 mm <sup>3</sup>
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·mm <sup>2</sup>	3.2267e+007 kg·mm <sup>2</sup>	3.2302e+007 kg·mm <sup>2</sup>	2.0539e+007 kg·mm <sup>2</sup>	2.4327e+007 kg·mm <sup>2</sup>
Moment of Inertia Ip2	63775 kg·mm <sup>2</sup>	4.4553e+005 kg·mm <sup>2</sup>	4.7654e+005 kg·mm <sup>2</sup>	59712 kg·mm <sup>2</sup>	63184 kg·mm <sup>2</sup>

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

**TABLE 4**  
**Analysis 3.1 > 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				
<b>Graphics Properties</b>					
Visible	Yes				
Transparency	1				
<b>Definition</b>					
Suppressed	No				
Material	Polyurethane				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
<b>Bounding Box</b>					
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	
<b>Properties</b>					
Volume	5.5389e+007 mm <sup>3</sup>	5.861e+007 mm <sup>3</sup>	1.2688e+008 mm <sup>3</sup>	7.5e+006 mm <sup>3</sup>	
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 <sup>2</sup>	2.4327e+007 kg·mm <sup>2</sup>	7.8835e+005 kg·mm <sup>2</sup>	37875 kg·mm <sup>2</sup>	
Moment of Inertia Ip2	59712 kg·mm <sup>2</sup>	63184 kg·mm <sup>2</sup>	5.3832e+007 kg·mm <sup>2</sup>	13875 kg·mm <sup>2</sup>	
Moment of Inertia Ip3	2.0487e+007 kg·mm <sup>2</sup>	2.4271e+007 kg·mm <sup>2</sup>	5.3056e+007 kg·mm <sup>2</sup>	51000 kg·mm <sup>2</sup>	
<b>Statistics</b>					
Nodes	200		336	254	
Elements	16		34	28	

**TABLE 5**  
**Analysis 3.1 > 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				
<b>Graphics Properties</b>					
Visible	Yes				
Transparency	1				
<b>Definition</b>					
Suppressed	No				
Material	Polyurethane			Carbon Fiber	
Stiffness Behavior	Flexible				

Nonlinear Material Effects	Yes			
<b>Bounding Box</b>				
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	
<b>Properties</b>				
Volume	7.5e+006 mm <sup>3</sup>	272.69 mm <sup>3</sup>	1.9112e+005 mm <sup>3</sup>	2.5612e+005 mm <sup>3</sup>
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	-1.1733e-009 mm
Centroid Y	4048.8 mm	-2.6037 mm	566.58 mm	1151.8 mm
Centroid Z	-2138.6 mm	307. mm	-258.97 mm	-586.06 mm
Moment of Inertia Ip1	37875 kg·mm <sup>2</sup>	4.9643e-004 kg·mm <sup>2</sup>	29.672 kg·mm <sup>2</sup>	79.172 kg·mm <sup>2</sup>
Moment of Inertia Ip2	13875 kg·mm <sup>2</sup>	4.809e-004 kg·mm <sup>2</sup>	4103.3 kg·mm <sup>2</sup>	22124 kg·mm <sup>2</sup>
Moment of Inertia Ip3	51000 kg·mm <sup>2</sup>	4.9643e-004 kg·mm <sup>2</sup>	4084.8 kg·mm <sup>2</sup>	22124 kg·mm <sup>2</sup>
<b>Statistics</b>				
Nodes	254	412	706	11732
Elements	28	180	104	1666

**TABLE 6**  
**Analysis 3.1 > Geometry > Parts**

Object Name	<i>carbon rod 3</i>	<i>carbon rod 4</i>	<i>carbon rod 5</i>	<i>carbon rod 6</i>	<i>Solid</i>
State	Meshed				
<b>Graphics Properties</b>					
Visible	Yes				
Transparency	1				
<b>Definition</b>					
Suppressed	No				
Material	Carbon Fiber				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
<b>Bounding Box</b>					
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
<b>Properties</b>					
Volume	3.6419e+005 mm <sup>3</sup>	6.0063e+005 mm <sup>3</sup>	5.8256e+005 mm <sup>3</sup>	7.1191e+005 mm <sup>3</sup>	4.9426e+005 mm <sup>3</sup>
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·mm <sup>2</sup>	101.09 kg·mm <sup>2</sup>	180.1 kg·mm <sup>2</sup>	220.08 kg·mm <sup>2</sup>	67.791 kg·mm <sup>2</sup>
Moment of Inertia Ip2	63528 kg·mm <sup>2</sup>	1.7325e+005 kg·mm <sup>2</sup>	2.5985e+005 kg·mm <sup>2</sup>	4.7413e+005 kg·mm <sup>2</sup>	2525.2 kg·mm <sup>2</sup>
Moment of Inertia	63528 kg·mm <sup>2</sup>	1.7331e+005	2.5985e+005	4.7413e+005	2521. kg·mm <sup>2</sup>

Ip3		kg-mm <sup>2</sup>	kg-mm <sup>2</sup>	kg-mm <sup>2</sup>	
<b>Statistics</b>					
Nodes	12240	521	13560	147398	445
Elements	1740	72	1930	72550	80

**TABLE 7**  
**Analysis 3.1 > Geometry > Parts**

Object Name	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>	<i>Solid</i>
State	Meshed				
<b>Graphics Properties</b>					
Visible	Yes				
Transparency	1				
<b>Definition</b>					
Suppressed	No				
Material	Carbon Fiber				
Stiffness Behavior	Flexible				
Nonlinear Material Effects	Yes				
<b>Bounding Box</b>					
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	
<b>Properties</b>					
Volume	1.087e+006 mm <sup>3</sup>	1.5457e+006 mm <sup>3</sup>	1.9096e+006 mm <sup>3</sup>	2.4725e+006 mm <sup>3</sup>	3.0215e+006 mm <sup>3</sup>
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 <sup>2</sup>	225.31 kg-mm <sup>2</sup>	269.69 kg-mm <sup>2</sup>	360.43 kg-mm <sup>2</sup>	440.47 kg-mm <sup>2</sup>
Moment of Inertia Ip2	23501 kg-mm <sup>2</sup>	67430 kg-mm <sup>2</sup>	1.3607e+005 kg-mm <sup>2</sup>	2.7568e+005 kg-mm <sup>2</sup>	5.0297e+005 kg-mm <sup>2</sup>
Moment of Inertia Ip3	23501 kg-mm <sup>2</sup>	67431 kg-mm <sup>2</sup>	1.3608e+005 kg-mm <sup>2</sup>	2.7568e+005 kg-mm <sup>2</sup>	5.0297e+005 kg-mm <sup>2</sup>
<b>Statistics</b>					
Nodes	1956	2710	340	4276	5204
Elements	363	506	54	803	979

**TABLE 8**  
**Analysis 3.1 > Geometry > Parts**

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

<b>Bounding Box</b>					
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
<b>Properties</b>					
Volume	4.9426e+005 mm <sup>3</sup>	1.087e+006 mm <sup>3</sup>	1.5457e+006 mm <sup>3</sup>	1.9096e+006 mm <sup>3</sup>	2.4725e+006 mm <sup>3</sup>
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·mm <sup>2</sup>	158.43 kg·mm <sup>2</sup>	225.31 kg·mm <sup>2</sup>	269.74 kg·mm <sup>2</sup>	360.43 kg·mm <sup>2</sup>
Moment of Inertia Ip2	2526.4 kg·mm <sup>2</sup>	23501 kg·mm <sup>2</sup>	67430 kg·mm <sup>2</sup>	1.3608e+005 kg·mm <sup>2</sup>	2.7568e+005 kg·mm <sup>2</sup>
Moment of Inertia Ip3	2522.3 kg·mm <sup>2</sup>	23501 kg·mm <sup>2</sup>	67431 kg·mm <sup>2</sup>	1.3609e+005 kg·mm <sup>2</sup>	2.7568e+005 kg·mm <sup>2</sup>
<b>Statistics</b>					
Nodes	445	1956	2710	496	4276
Elements	80	363	506	90	803

**TABLE 9**  
**Analysis 3.1 > Geometry > Parts**

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

**Connections**

**TABLE 10**  
**Analysis 3.1 > Connections**

Object Name	Connections
State	Fully Defined
<b>Auto Detection</b>	
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
<b>Transparency</b>	
Enabled	Yes

**TABLE 11**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region	Contact Region 2	Contact Region 3	Contact Region 4	Contact Region 5
State	Fully Defined				
<b>Scope</b>					
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
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

**TABLE 12**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 6	Contact Region 7	Contact Region 8	Contact Region 9	Contact Region 10
State	Fully Defined				
<b>Scope</b>					
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
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

**TABLE 13**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 11	Contact Region 12	Contact Region 13	Contact Region 14	Contact Region 15
State	Fully Defined				
<b>Scope</b>					
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	
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

**TABLE 14**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 16	Contact Region 17	Contact Region 18	Contact Region 19	Contact Region 20
State	Fully Defined				
<b>Scope</b>					
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	
<b>Definition</b>					

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

**TABLE 15**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 21	Contact Region 22	Contact Region 23	Contact Region 24	Contact Region 25
State	Fully Defined				
<b>Scope</b>					
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
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

**TABLE 16**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 26	Contact Region 27	Contact Region 28	Contact Region 29	Contact Region 30
State	Fully Defined				
<b>Scope</b>					
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		
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				

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

**TABLE 17**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 31	Contact Region 32	Contact Region 33	Contact Region 34	Contact Region 35
State	Fully Defined				
<b>Scope</b>					
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
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

**TABLE 18**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 36	Contact Region 37	Contact Region 38	Contact Region 39	Contact Region 40
State	Fully Defined				
<b>Scope</b>					
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
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				

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

**TABLE 19**  
**Analysis 3.1 > Connections > Contact Regions**

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

**TABLE 20**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 46	Contact Region 47	Contact Region 48	Contact Region 49	Contact Region 50
State	Fully Defined				
<b>Scope</b>					
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
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				

Pinball Region	Program Controlled
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**TABLE 21**  
**Analysis 3.1 > Connections > Contact Regions**

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

**TABLE 22**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 56	Contact Region 57	Contact Region 58	Contact Region 59	Contact Region 60
State	Fully Defined				
<b>Scope</b>					
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
<b>Definition</b>					
Type	Bonded				
Scope Mode	Automatic				
Behavior	Symmetric				
Suppressed	No				
<b>Advanced</b>					
Formulation	Pure Penalty				
Normal Stiffness	Program Controlled				
Update Stiffness	Never				
Thermal Conductance	Program Controlled				
Pinball Region	Program Controlled				

**TABLE 23**  
**Analysis 3.1 > Connections > Contact Regions**

--	--

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

**TABLE 24**  
**Analysis 3.1 > Connections > Contact Regions**

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

**TABLE 25**  
**Analysis 3.1 > Connections > Contact Regions**

Object Name	Contact Region 71	Contact Region 72	Contact Region 73	Contact Region 74	Contact Region 75
State	Fully Defined				
<b>Scope</b>					

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

**TABLE 26**  
**Analysis 3.1 > Connections > Contact Regions**

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

**Mesh**

**TABLE 27**  
**Analysis 3.1 > Mesh**

Object Name	<i>Mesh</i>
State	Solved
<b>Defaults</b>	
Physics Preference	Mechanical
Relevance	0

<b>Advanced</b>	
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
<b>Statistics</b>	
Nodes	221573
Elements	84427

## Static Structural

**TABLE 28**  
**Analysis 3.1 > Analysis**

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

**TABLE 29**  
**Analysis 3.1 > Static Structural > Analysis Settings**

Object Name	<i>Analysis Settings</i>
State	Fully Defined
<b>Step Controls</b>	
Number Of Steps	1.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
<b>Solver Controls</b>	
Solver Type	Program Controlled
Weak Springs	Program Controlled
Large Deflection	Off
Inertia Relief	Off
<b>Nonlinear Controls</b>	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
<b>Output Controls</b>	
Calculate Stress	Yes
Calculate Strain	Yes
Calculate Results At	All Time Points

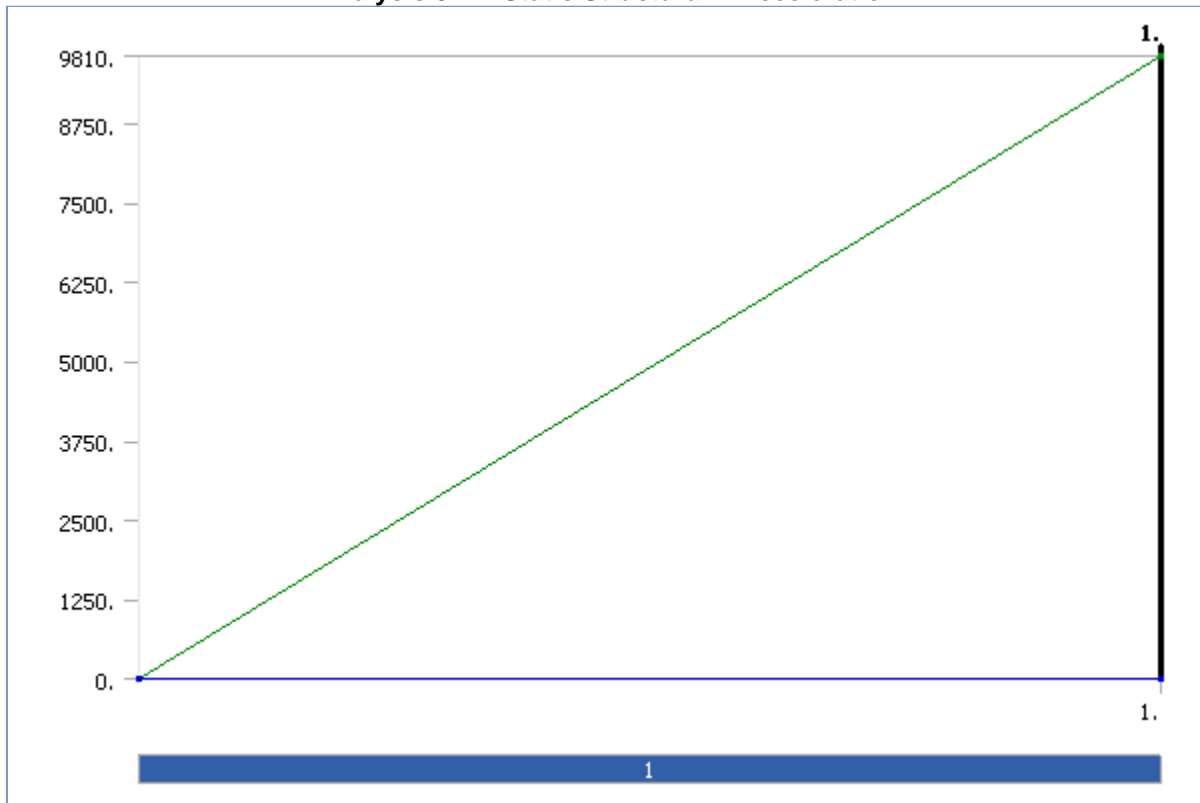


Analysis Data Management	
Solver Files Directory	C:\Documents and Settings\Jinnuri\Desktop\website\full2\ful2 Simulation Files\Static Structural\
Future Analysis	None
Save ANSYS db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No

**TABLE 30**  
**Analysis 3.1 > Static Structural > Accelerations**

Object Name	<i>Acceleration</i>
State	Suppressed
<b>Scope</b>	
Geometry	All Bodies
<b>Definition</b>	
Define By	Components
X Component	0. mm/s <sup>2</sup> (ramped)
Y Component	9810. mm/s <sup>2</sup> (ramped)
Z Component	0. mm/s <sup>2</sup> (ramped)
Suppressed	Yes

**FIGURE 1**  
**Analysis 3.1 > Static Structural > Acceleration**

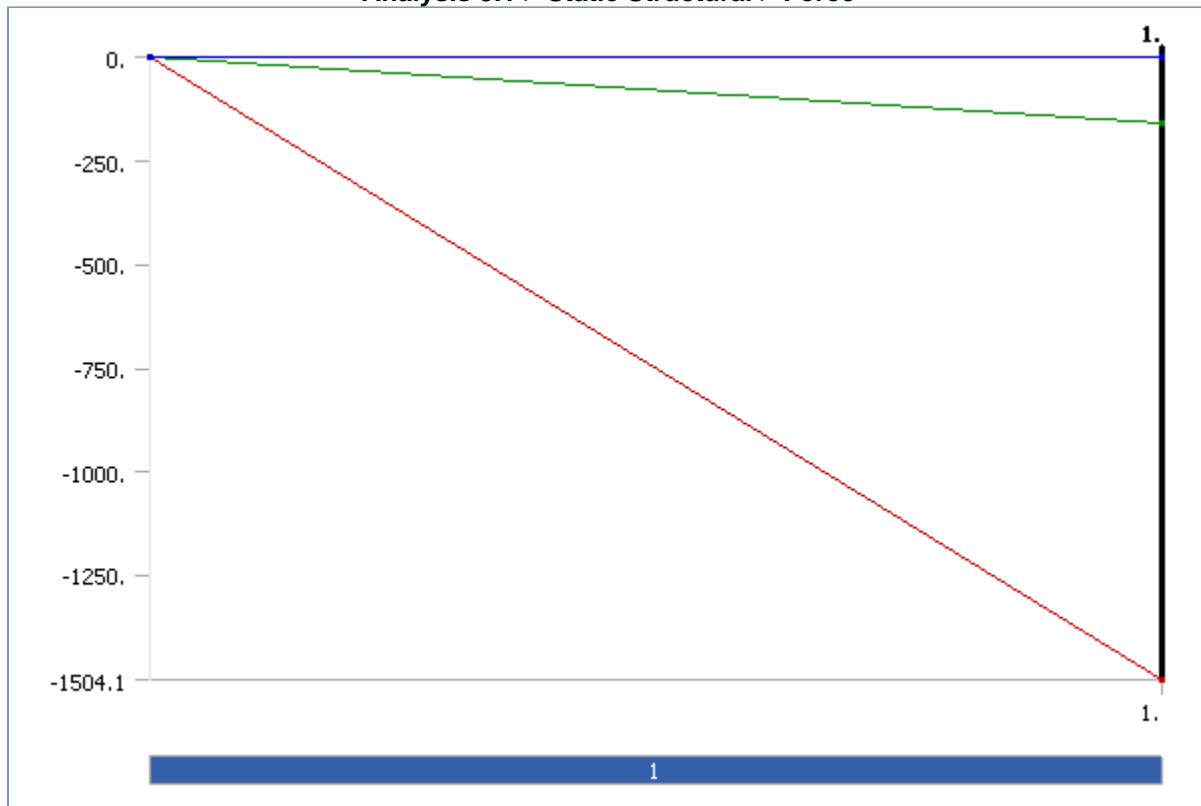


**TABLE 31**  
**Analysis 3.1 > Static Structural > Loads**

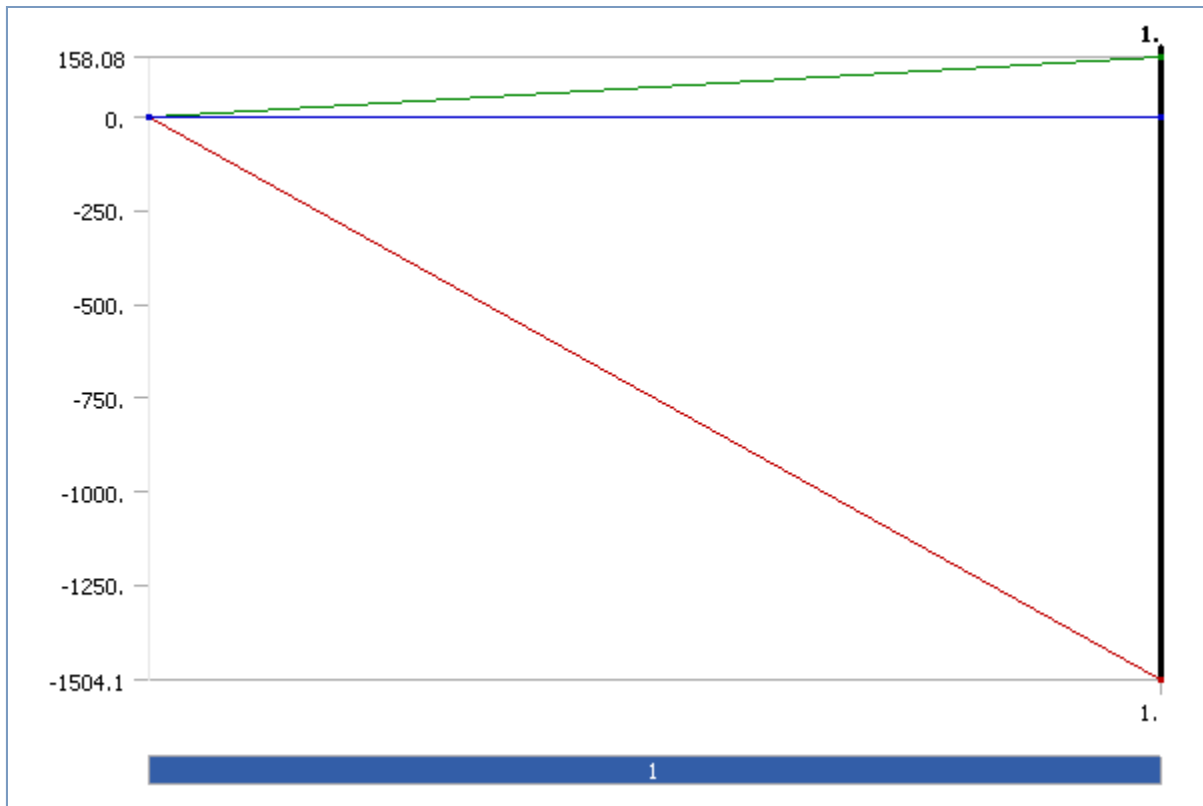
Object Name	<i>Force</i>	<i>Force 2</i>	<i>Force 3</i>	<i>Force 4</i>	<i>Fixed Support</i>
State	Fully Defined				
<b>Scope</b>					

Scoping Method	Geometry Selection				
Geometry	1 Face			2 Faces	
<b>Definition</b>					
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				

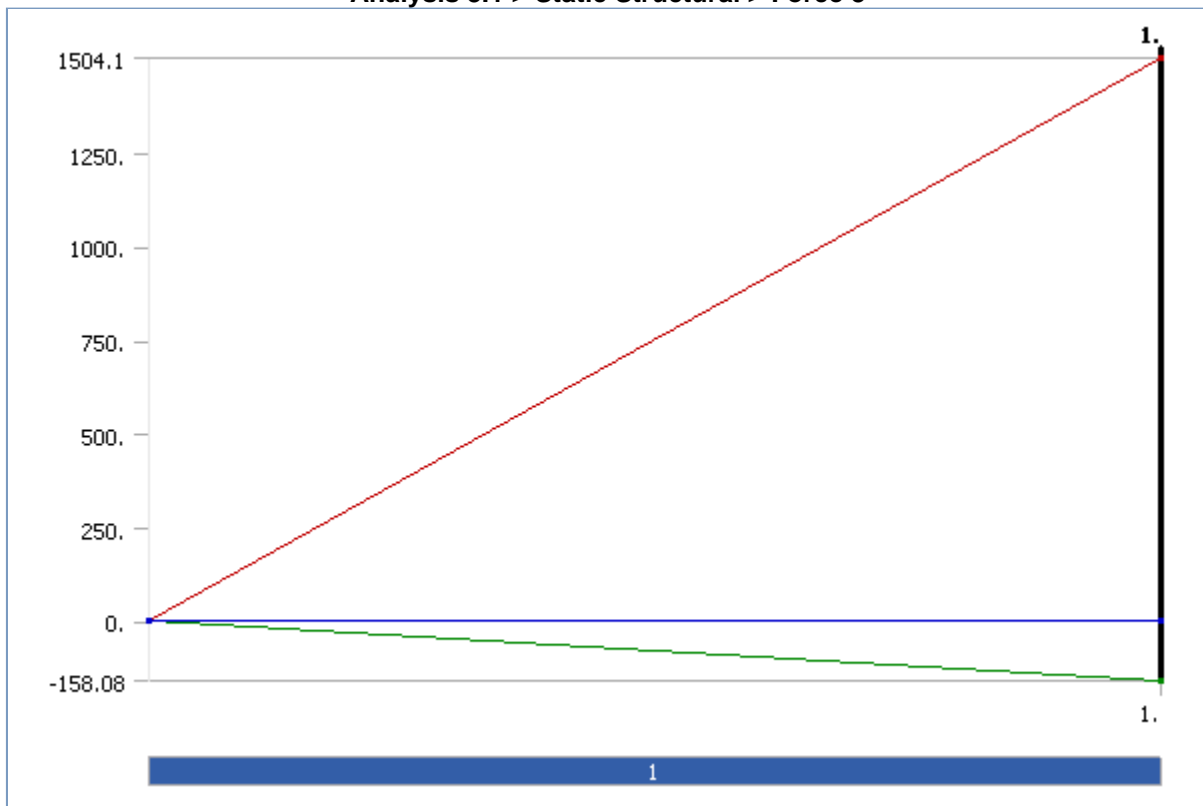
**FIGURE 2**  
Analysis 3.1 > Static Structural > Force



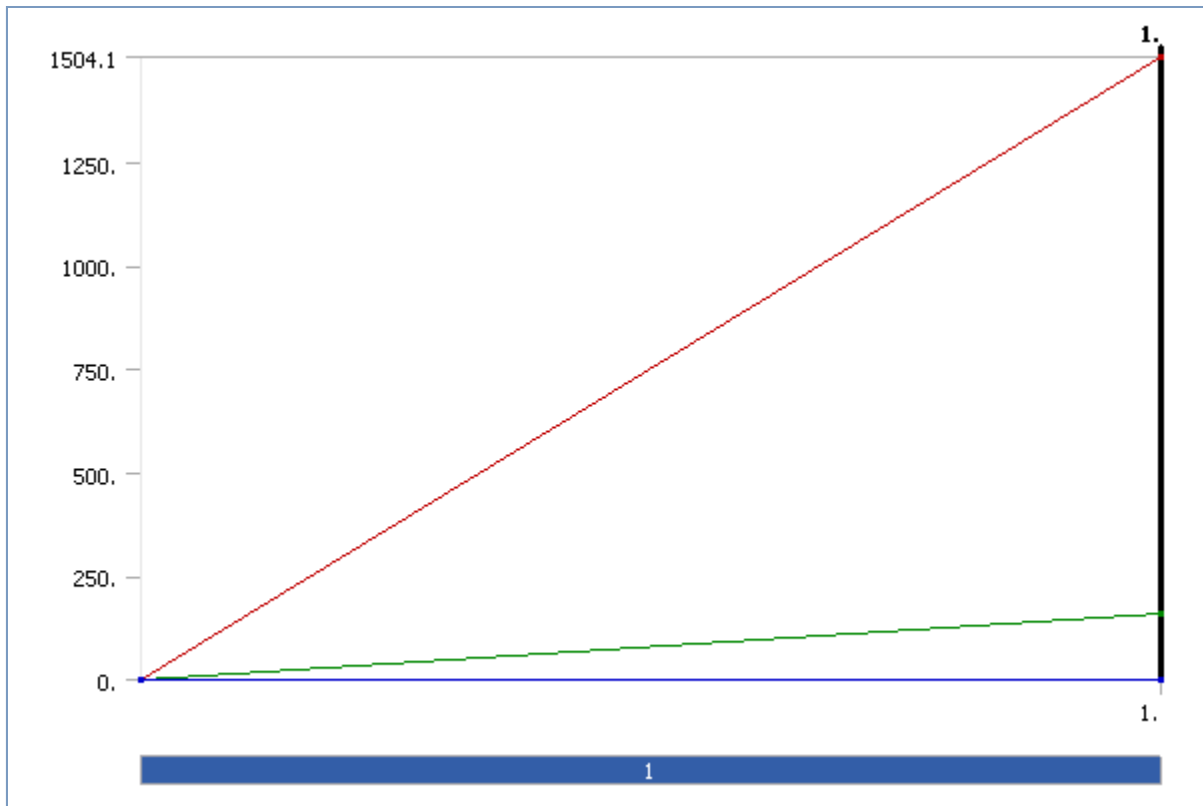
**FIGURE 3**  
Analysis 3.1 > Static Structural > Force 2



**FIGURE 4**  
Analysis 3.1 > Static Structural > Force 3



**FIGURE 5**  
Analysis 3.1 > Static Structural > Force 4



**TABLE 32**  
**Analysis 3.1 > Static Structural > Loads**

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

**FIGURE 6**  
**Analysis 3.1 > Static Structural > Displacement**



**Solution**

**TABLE 33**  
**Analysis 3.1 > Static Structural > Solution**

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

**TABLE 34**  
**Analysis 3.1 > Static Structural > Solution > Solution Information**

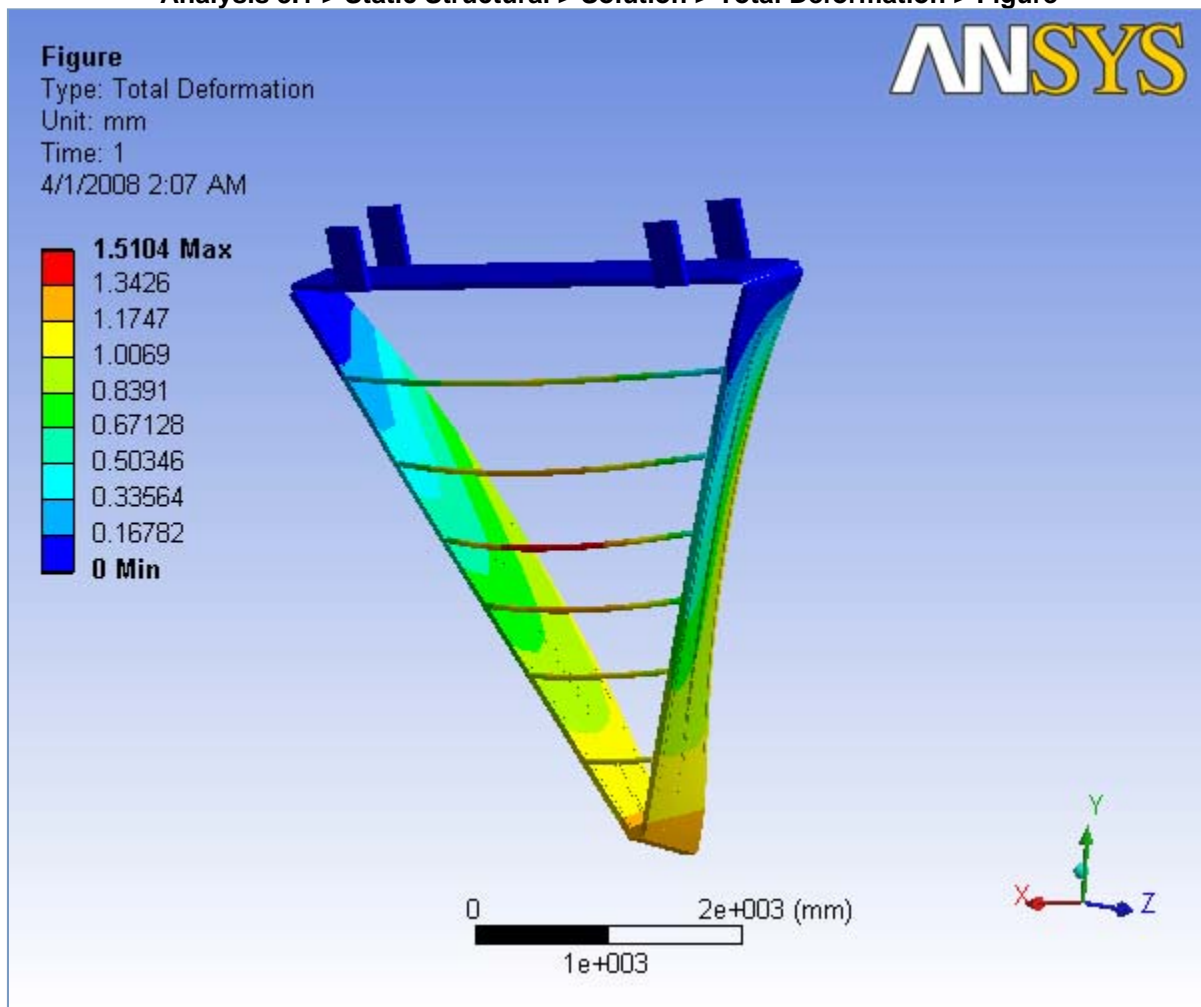
Object Name	<i>Solution Information</i>
State	Solved
<b>Solution Information</b>	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Update Interval	2.5 s
Display Points	All

**TABLE 35**  
**Analysis 3.1 > Static Structural > Solution > Results**

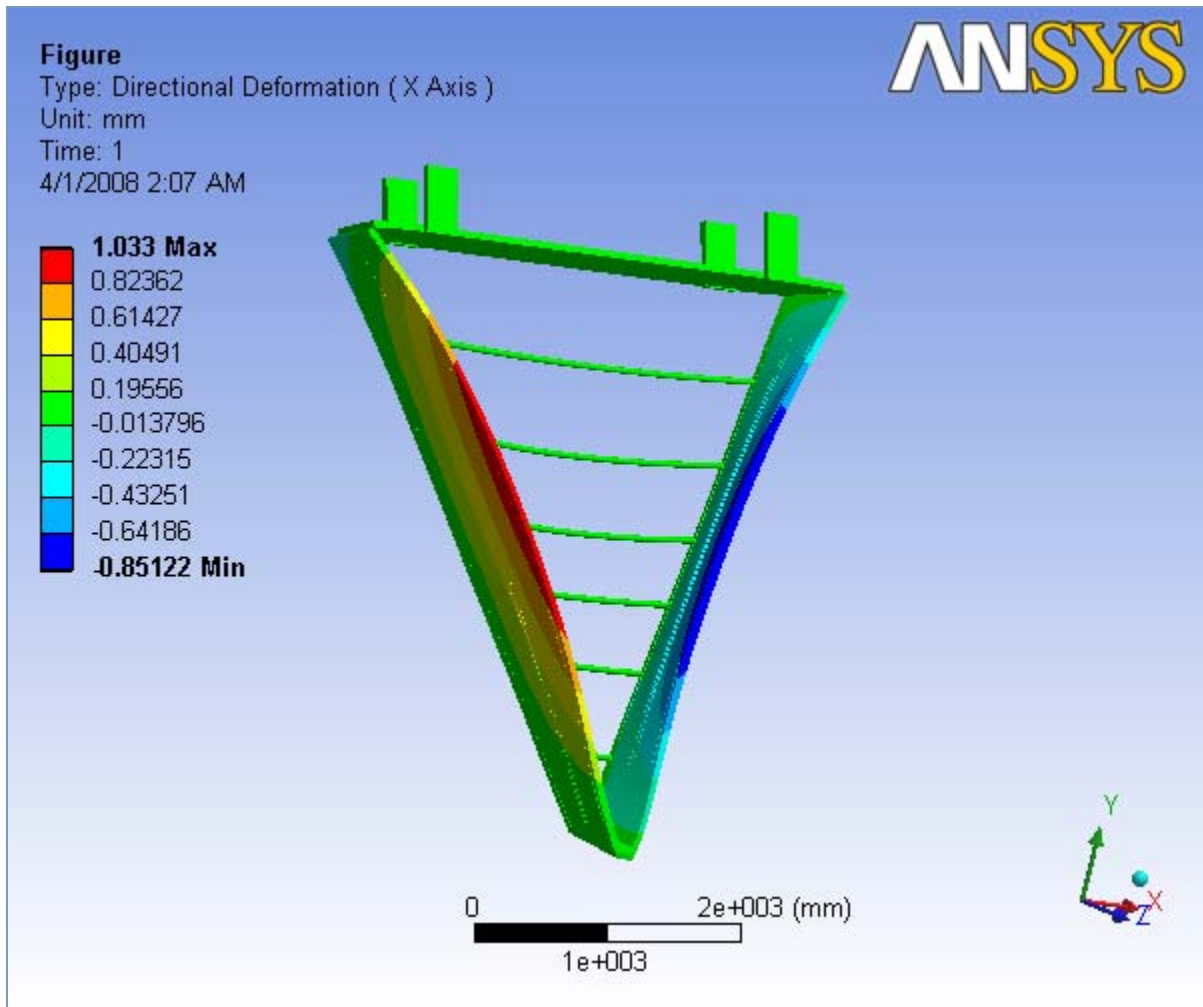
Object Name	<i>Total Deformation</i>	<i>Directional Deformation-x</i>	<i>Directional Deformation -y</i>	<i>Directional Deformation -z</i>
State	Solved			
<b>Scope</b>				
Geometry	All Bodies			
<b>Definition</b>				

Type	Total Deformation	Directional Deformation		
Display Time	End Time			
Orientation		X Axis	Y Axis	Z Axis
<b>Results</b>				
Minimum	0. mm	-0.85122 mm	-0.6966 mm	-1.3553 mm
Maximum	1.5104 mm	1.033 mm	0.28554 mm	6.757e-002 mm
Minimum Occurs On	slider hinge 1	End plate 1	Nose	carbon rod 4
Maximum Occurs On	carbon rod 4	End Plate 2		End plate 1
<b>Information</b>				
Time	1. s			
Load Step	1			
Substep	1			
Iteration Number	1			

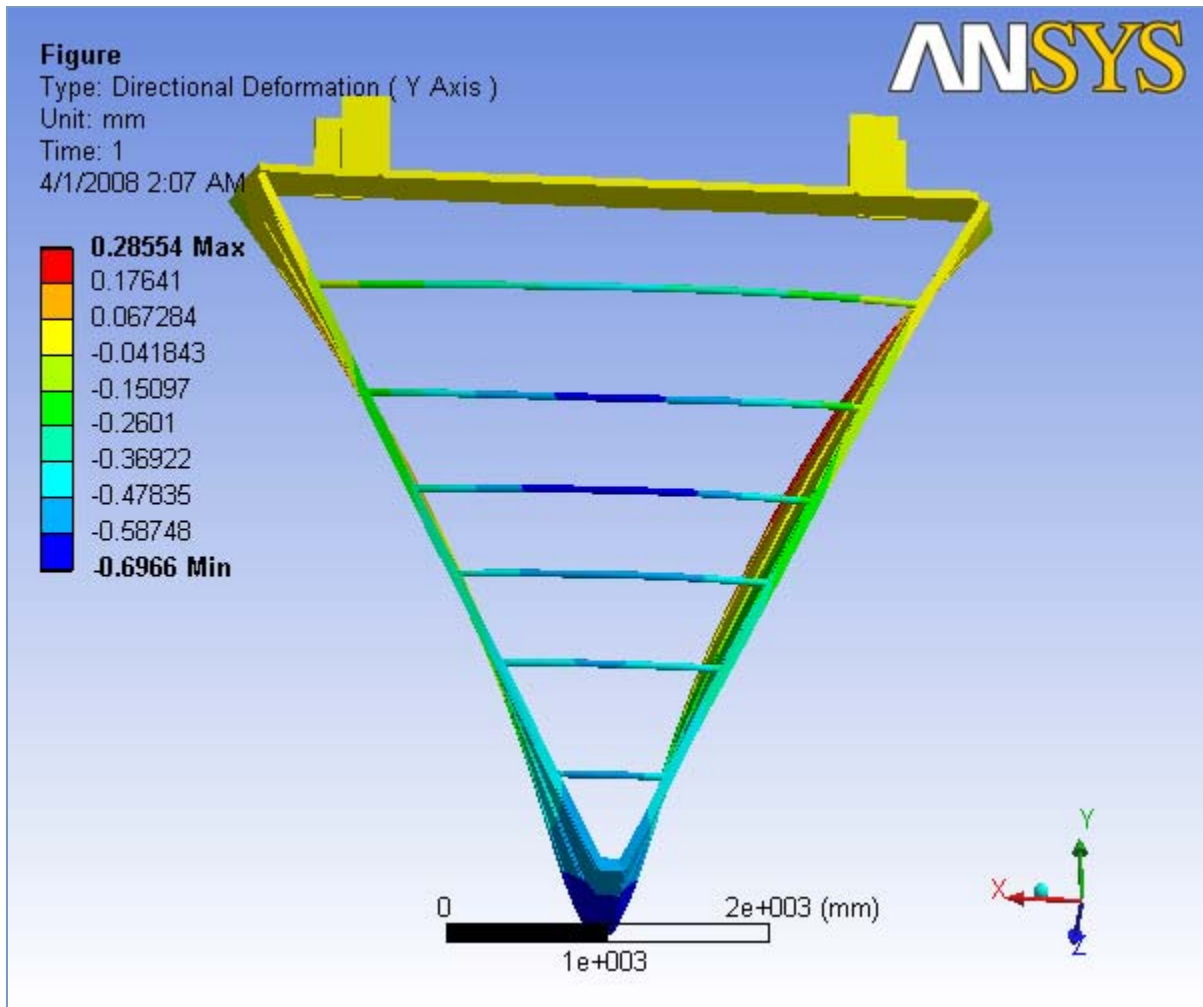
**FIGURE 7**  
**Analysis 3.1 > Static Structural > Solution > Total Deformation > Figure**



**FIGURE 8**  
**Analysis 3.1 > Static Structural > Solution > Directional Deformation-x > Figure**

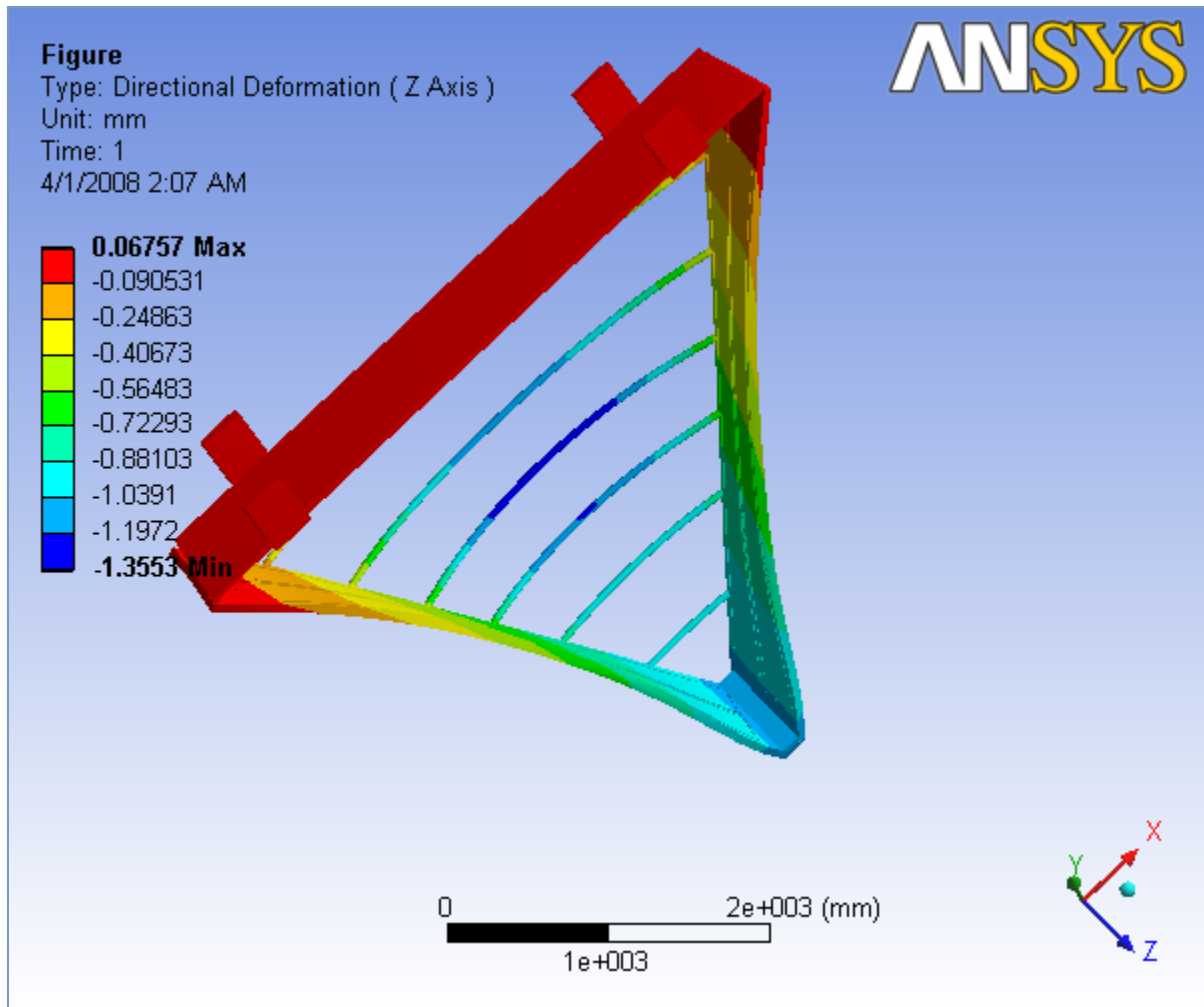


**FIGURE 9**  
 Analysis 3.1 > Static Structural > Solution > Directional Deformation -y > Figure



**FIGURE 10**  
 Analysis 3.1 > Static Structural > Solution > Directional Deformation -z > Figure





## Material Data

### *Polyurethane*

**TABLE 36**  
**Polyurethane > Constants**

<b>Structural</b>	
Young's Modulus	9751.9 MPa
Poisson's Ratio	0.3
Density	2.4e-007 kg/mm <sup>3</sup>
Thermal Expansion	1.2e-005 1/°C
<b>Thermal</b>	
Thermal Conductivity	0. W/mm·°C
Specific Heat	0. J/kg·°C
<b>Electromagnetics</b>	
Relative Permeability	0.
Resistivity	0. Ohm-mm

### *Carbon Fiber*

**TABLE 37**

**Carbon Fiber > Constants**

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