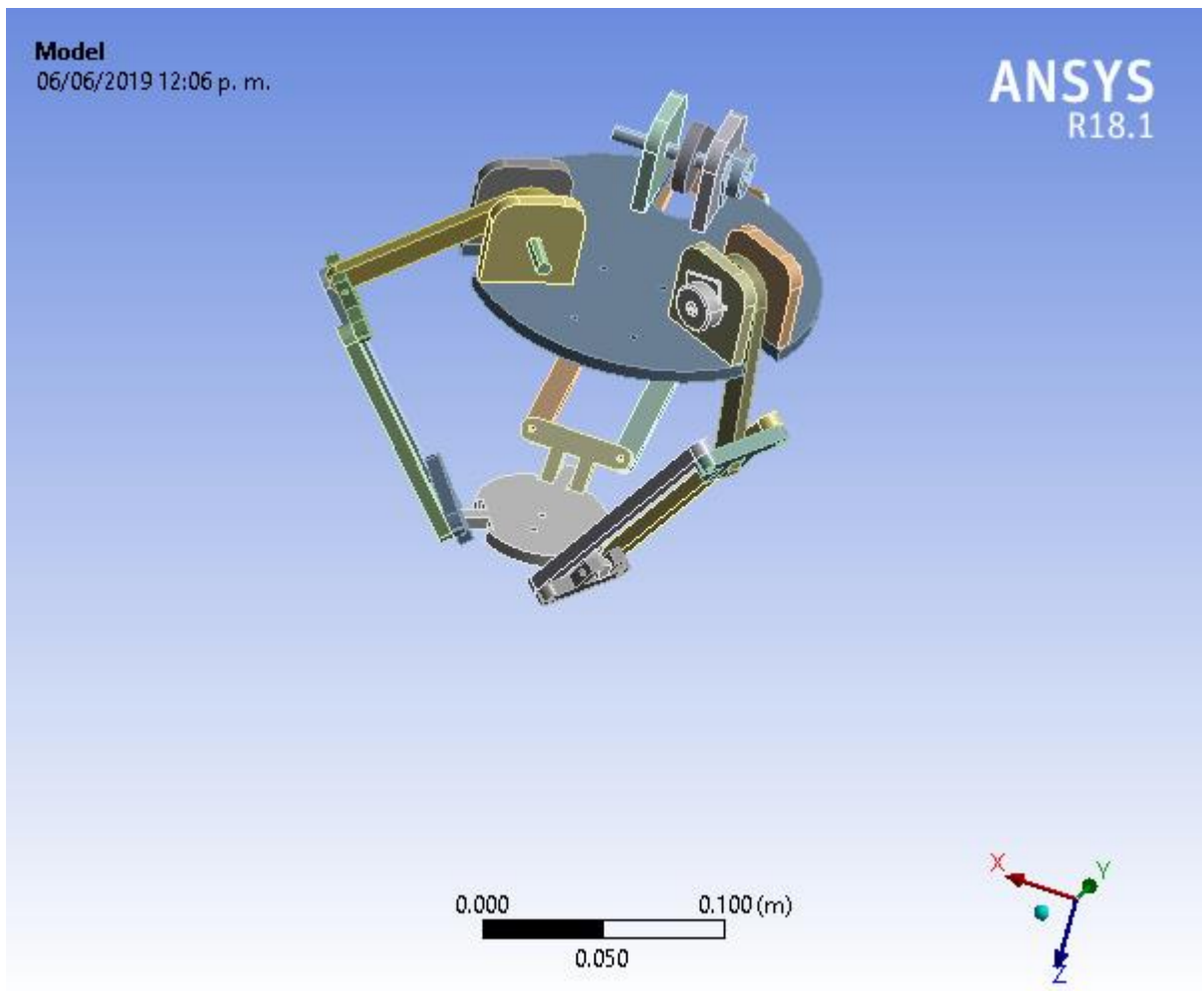




Project

First Saved	Thursday, June 6, 2019
Last Saved	Thursday, June 6, 2019
Product Version	18.1 Release
Save Project Before Solution	No
Save Project After Solution	No



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Report Not Finalized

Not all objects described below are in a finalized state. As a result, data may be incomplete, obsolete or in error. View first state problem. To finalize this report, edit objects as needed and solve the analyses.

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 (B4)

Geometry

TABLE 2
Model (B4) > Geometry

Object Name	<i>Geometry</i>
State	Fully Defined
Definition	
Source	C:\Users\cesar\OneDrive\Desktop\braso garabito\delta_man_asm.IGS

Transparency	1										
Definition											
Suppressed	No										
Stiffness Behavior	Flexible										
Coordinate System	Default Coordinate System										
Reference Temperature	By Environment										
Behavior	None										
Material											
Assignment	Polyethylene										
Nonlinear Effects	Yes										
Thermal Strain Effects	Yes										
Bounding Box											
Length X	7.2087e-002 m	6.289e-002 m	2.9154e-002 m		7.1367e-002 m		4.8e-002 m	3.9435e-002 m	3.9503e-002 m		
Length Y	6.699e-002 m	8.2152e-002 m	4.9068e-002 m		6.6793e-002 m		1.4001e-002 m	5.3737e-002 m	5.3751e-002 m		
Length Z	2.6909e-002 m	0.10057 m	0.12459 m		0.10479 m		2.5569e-002 m	3.5104e-002 m	3.5057e-002 m		
Properties											
Volume	1.523e-005 m³	7.5864e-006 m³						3.6861e-006 m³			
Mass	1.4468e-002 kg	7.2071e-003 kg						3.5018e-003 kg			
Centroid X	9.2043e-002 m	0.1683 m	0.1488 m	0.10315 m	6.4152e-002 m	3.2837e-002 m	5.2337e-002 m	9.2543e-002 m	6.5382e-002 m	0.12807 m	0.18009 m
Centroid Y	0.23475 m	0.19192 m	0.1598 m	0.29898 m		0.21661 m	0.18449 m	0.2724 m	0.22347 m	0.21264 m	0.14209 m
Centroid Z	0.24108 m	0.19139 m	0.20185 m	0.16286 m		0.20226 m	0.21272 m	0.21994 m	0.25442 m	0.23864 m	0.14718 m
Moment of Inertia Ip1	3.2336e-006 kg·m²	8.1323e-008 kg·m²						1.5646e-007 kg·m²			
Moment of Inertia Ip2	3.2394e-006 kg·m²	9.6938e-006 kg·m²						6.2956e-007 kg·m²			
Moment of Inertia Ip3	6.3857e-006 kg·m²	9.6557e-006 kg·m²						4.9449e-007 kg·m²			
Statistics											
Nodes	11613	1989						5558			
Elements	6199	241						2878			
Mesh Metric	None										

TABLE 4
Model (B4) > Geometry > Parts

Object Name	Part 12	Part 13	Part 14	Part 15	Part 16	Part 17	Part 18	Part 19	Part 20	Part 21	Part 22
-------------	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------	---------

Visible	Yes			No			
Transparency	1						
Definition							
Suppressed	No			Yes			
Stiffness Behavior	Flexible						
Coordinate System	Default Coordinate System						
Reference Temperature	By Environment						
Behavior	None						
Material							
Assignment	Polyethylene			Structural Steel			
Nonlinear Effects	Yes						
Thermal Strain Effects	Yes						
Bounding Box							
Length X	6.e-003 m	3.7641e-002 m	0.15119 m	6.e-003 m	0.20351 m		
Length Y	5.0417e-002 m	3.6341e-002 m	0.14499 m	9.5e-002 m	6.e-003 m		
Length Z	5.0417e-002 m	4.5835e-002 m	5.2302e-002 m	6.e-002 m	0.18144 m		
Properties							
Volume	8.8713e-006 m³			9.4212e-005 m³	1.3701e-005 m³		1.2397e-004 m³
Mass	8.4277e-003 kg			8.9502e-002 kg	0.10756 kg		0.97313 kg
Centroid X	6.126e-002 m	3.4381e-002 m	0.12714 m	7.425e-002 m	8.7266e-002 m	6.1398e-002 m	7.429e-002 m
Centroid Y	0.23951 m	0.15226 m	0.17367 m	0.19543 m	0.13077 m		9.4509e-002 m
Centroid Z	7.3631e-002 m	0.10204 m	9.5067e-002 m	0.11162 m	0.1135 m		0.13675 m
Moment of Inertia Ip1	2.2657e-006 kg·m²			1.2397e-004 kg·m²	8.4484e-005 kg·m²		1.8007e-003 kg·m²
Moment of Inertia Ip2	1.1593e-006 kg·m²			1.2424e-004 kg·m²	1.3139e-005 kg·m²		5.2476e-003 kg·m²
Moment of Inertia Ip3	1.157e-006 kg·m²			2.4768e-004 kg·m²	7.1991e-005 kg·m²		3.4527e-003 kg·m²
Statistics							
Nodes	1073			229953	0		
Elements	134			32679	0		
Mesh Metric	None						

Coordinate Systems

TABLE 6
Model (B4) > 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.]

Connections

TABLE 7
Model (B4) > Connections

Object Name	<i>Connections</i>
State	Fully Defined
Auto Detection	
Generate Automatic Connection On Refresh	Yes
Transparency	
Enabled	Yes

TABLE 8
Model (B4) > Connections > Contacts

Object Name	<i>Contacts</i>
State	Fully Defined
Definition	
Connection Type	Contact
Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Auto Detection	
Tolerance Type	Slider
Tolerance Slider	0.
Tolerance Value	9.8569e-004 m
Use Range	No
Face/Face	Yes
Face Overlap Tolerance	Off
Cylindrical Faces	Include
Face/Edge	No
Edge/Edge	No
Priority	Include All
Group By	Bodies
Search Across	Bodies
Statistics	
Connections	37
Active Connections	33

TABLE 9
Model (B4) > Connections > Contacts > Contact Regions

Object Name	Contact Region	Contact Region 2	Contact Region 3	Contact Region 4	Contact Region 5	Contact Region 6	Contact Region 7	Contact Region 8	Contact Region 9	Contact Region 10	Contact Region 11
State	Fully Defined										
Scope											
Scoping Method	Geometry Selection										
Contact	1 Face										
Target	1 Face										
Contact Bodies	Part 1			Part 2		Part 3		Part 4		Part 5	
Target Bodies	Part 8	Part 9	Part 10		Part 11	Part 10	Part 11	Part 8	Part 12	Part 8	Part 12
Definition											
Type	Bonded										
Scope Mode	Automatic										
Behavior	Program Controlled										
Trim Contact	Program Controlled										
Trim Tolerance	9.8569e-004 m										
Suppressed	No										
Advanced											
Formulation	Program Controlled										
Detection Method	Program Controlled										
Penetration Tolerance	Program Controlled										
Elastic Slip Tolerance	Program Controlled										
Normal Stiffness	Program Controlled										
Update Stiffness	Program Controlled										
Pinball Region	Program Controlled										
Geometric Modification											
Contact Geometry Correction	None										
Target Geometry Correction	None										

TABLE 10
Model (B4) > Connections > Contacts > Contact Regions

Object Name	Contact Region 12	Contact Region 13	Contact Region 14	Contact Region 15	Contact Region 16	Contact Region 17	Contact Region 18	Contact Region 19	Contact Region 20	Contact Region 21	Contact Region 22
-------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------	-------------------

State	Fully Defined											
Scope												
Scoping Method	Geometry Selection											
Contact	1 Face						2 Faces			4 Faces		
Target	1 Face						4 Faces			2 Faces		
Contact Bodies	Part 6		Part 7		Part 11	Part 12	Part 13	Part 14	Part 15	Part 16	Part 17	
Target Bodies	Part 9	Part 13	Part 9	Part 13	Part 14	Part 15	Part 16	Part 19	Part 18	Part 17	Part 20	
Definition												
Type	Bonded											
Scope Mode	Automatic											
Behavior	Program Controlled											
Trim Contact	Program Controlled											
Trim Tolerance	9.8569e-004 m											
Suppressed	No											
Advanced												
Formulation	Program Controlled											
Detection Method	Program Controlled											
Penetration Tolerance	Program Controlled											
Elastic Slip Tolerance	Program Controlled											
Normal Stiffness	Program Controlled											
Update Stiffness	Program Controlled											
Pinball Region	Program Controlled											
Geometric Modification												
Contact Geometry Correction	None											
Target Geometry Correction	None											

TABLE 11
Model (B4) > Connections > Contacts > Contact Regions

Model (24) - Connections - Contacts - Contact Regions											
Object Name	Contact Region 23	Contact Region 24	Contact Region 25	Contact Region 26	Contact Region 27	Contact Region 28	Contact Region 29	Contact Region 30	Contact Region 31	Contact Region 32	Contact Region 33
State	Fully Defined										
Scope											

Scoping Method	Geometry Selection										
Contact	4 Faces		3 Faces	4 Faces		1 Face					
Target	3 Faces	2 Faces	3 Faces	2 Faces	3 Faces	1 Face					
Contact Bodies	Part 17	Part 18		Part 19		Part 20	Part 21	Part 22	Part 23	Part 24	Part 25
Target Bodies	Part 24	Part 21	Part 23	Part 22	Part 25	Part 26					
Definition											
Type	Bonded										
Scope Mode	Automatic										
Behavior	Program Controlled										
Trim Contact	Program Controlled										
Trim Tolerance	9.8569e-004 m										
Suppressed	No										
Advanced											
Formulation	Program Controlled										
Detection Method	Program Controlled										
Penetration Tolerance	Program Controlled										
Elastic Slip Tolerance	Program Controlled										
Normal Stiffness	Program Controlled										
Update Stiffness	Program Controlled										
Pinball Region	Program Controlled										
Geometric Modification											
Contact Geometry Correction	None										
Target Geometry Correction	None										

TABLE 12
Model (B4) > Connections > Contacts > Contact Regions

Object Name	Contact Region 34	Contact Region 35	Contact Region 36	Contact Region 37
State	Suppressed			
Scope				
Scoping Method	Geometry Selection			
Contact	1 Face		No Selection	
Target	No Selection			

Contact Bodies	Part 26		Part 27	Part 28
Target Bodies	Part 27	Part 28	Part 29	
Definition				
Type	Bonded			
Scope Mode	Automatic			
Behavior	Program Controlled			
Trim Contact	Program Controlled			
Trim Tolerance	9.8569e-004 m			
Suppressed	No			
Advanced				
Formulation	Program Controlled			
Detection Method	Program Controlled			
Penetration Tolerance	Program Controlled			
Elastic Slip Tolerance	Program Controlled			
Normal Stiffness	Program Controlled			
Update Stiffness	Program Controlled			
Pinball Region	Program Controlled			
Geometric Modification				
Contact Geometry Correction	None			
Target Geometry Correction	None			

Mesh

TABLE 13
Model (B4) > Mesh

Object Name	<i>Mesh</i>
State	Solved
Display	
Display Style	Body Color
Defaults	
Physics Preference	Mechanical
Relevance	0
Element Order	Program Controlled
Sizing	
Size Function	Adaptive
Relevance Center	Coarse
Element Size	Default
Initial Size Seed	Assembly
Transition	Fast
Span Angle Center	Fine
Automatic Mesh Based Defeaturing	On
Defeature Size	Default
Minimum Edge Length	2.6391e-005 m
Quality	
Check Mesh Quality	Yes, Errors
Error Limits	Standard Mechanical
Target Quality	Default (0.050000)

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
View Advanced Options	No
Advanced	
Number of CPUs for Parallel Part Meshing	Program Controlled
Straight Sided Elements	No
Number of Retries	Default (4)
Rigid Body Behavior	Dimensionally Reduced
Mesh Morphing	Disabled
Triangle Surface Mesher	Program Controlled
Topology Checking	No
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	326253
Elements	71893

Named Selections

TABLE 14
Model (B4) > Named Selections > Named Selections

Object Name	<i>Selection</i>
State	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	7 Bodies
Definition	
Send to Solver	Yes
Visible	Yes
Program Controlled Inflation	Exclude
Statistics	
Type	Manual
Total Selection	7 Bodies
Suppressed	0
Used by Mesh Worksheet	No

Static Structural (B5)

TABLE 15
Model (B4) > Analysis

Object Name	<i>Static Structural (B5)</i>
-------------	-------------------------------

State	Solved
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 16
Model (B4) > Static Structural (B5) > Analysis Settings

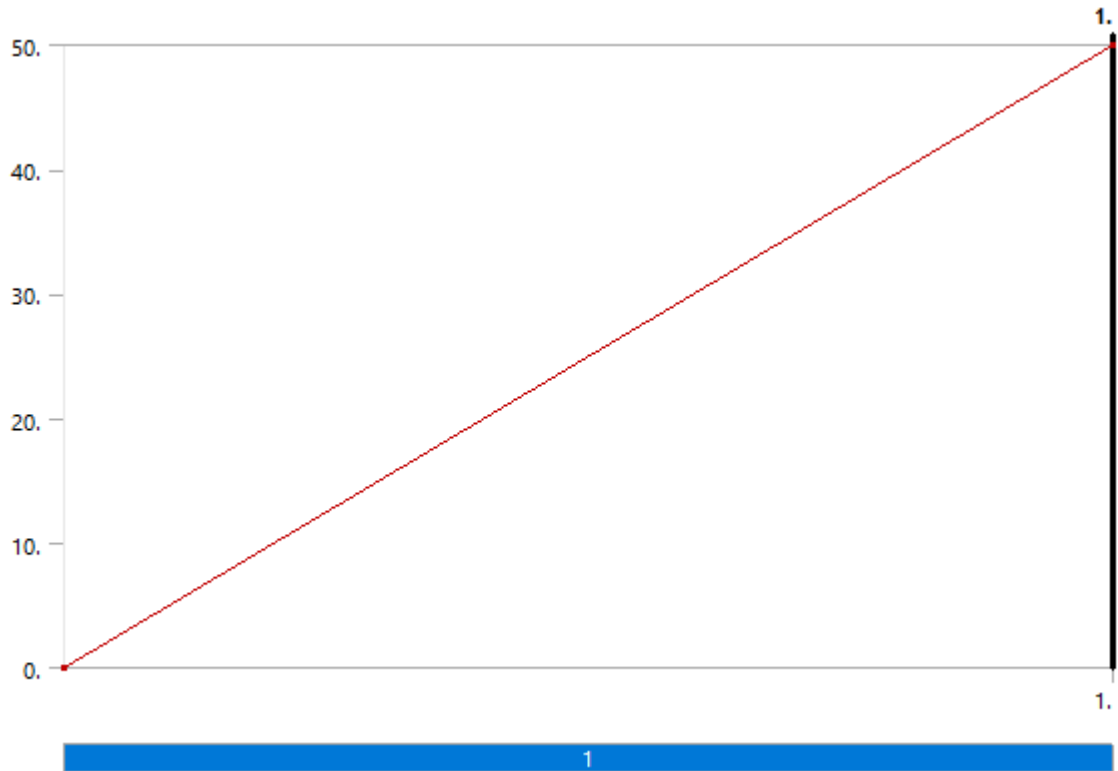
Object Name	<i>Analysis Settings</i>
State	Fully Defined
Step Controls	
Number Of Steps	1.
Current Step Number	1.
Step End Time	1. s
Auto Time Stepping	Program Controlled
Solver Controls	
Solver Type	Program Controlled
Weak Springs	Off
Solver Pivot Checking	Program Controlled
Large Deflection	Off
Inertia Relief	Off
Rotordynamics Controls	
Coriolis Effect	Off
Restart Controls	
Generate Restart Points	Program Controlled
Retain Files After Full Solve	No
Combined 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	Off
Output Controls	

Stress	Yes
Strain	Yes
Nodal Forces	No
Contact	No
Miscellaneous	No
General	No
Miscellaneous	No
Store Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Users\cesar\AppData\Local\Temp\WB_DESKTOP-GVS6OPA_cesar_14104_2\unsaved_project_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	mks

TABLE 17
Model (B4) > Static Structural (B5) > Loads

Object Name	Pressure	Fixed Support
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	1 Face	
Definition		
Type	Pressure	Fixed Support
Define By	Normal To	
Applied By	Surface Effect	
Magnitude	50. Pa (ramped)	
Suppressed	No	

FIGURE 1
Model (B4) > Static Structural (B5) > Pressure



Solution (B6)

TABLE 18
Model (B4) > Static Structural (B5) > Solution

Object Name	<i>Solution (B6)</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	27. s
MAPDL Memory Used	3.3965 GB
MAPDL Result File Size	93.625 MB
Post Processing	
Beam Section Results	No

TABLE 19
Model (B4) > Static Structural (B5) > Solution (B6) > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
Newton-Raphson Residuals	0
Identify Element Violations	0

Update Interval	2.5 s
Display Points	All
FE Connection Visibility	
Activate Visibility	Yes
Display	All FE Connectors
Draw Connections Attached To	All Nodes
Line Color	Connection Type
Visible on Results	No
Line Thickness	Single
Display Type	Lines

TABLE 20
Model (B4) > Static Structural (B5) > Solution (B6) > Results

Object Name	Total Deformation	Equivalent Elastic Strain	Equivalent Stress	Strain Energy
State	Solved			
Scope				
Scoping Method	Geometry Selection			
Geometry	All Bodies			
Definition				
Type	Total Deformation	Equivalent Elastic Strain	Equivalent (von-Mises) Stress	Strain Energy
By	Time			
Display Time	Last			
Calculate Time History	Yes			
Identifier				
Suppressed	No			
Results				
Minimum	0. m	0. m/m	0. Pa	0. J
Maximum	2.3703 m	4.9516e-005 m/m	1.6678e+005 Pa	3.675e-008 J
Minimum Occurs On	Part 26			Part 17
Maximum Occurs On	Part 6	Part 14	Part 19	Part 14
Information				
Time	1. s			
Load Step	1			
Substep	1			
Iteration Number	1			
Integration Point Results				
Display Option		Averaged		
Average Across Bodies		No		

FIGURE 2
Model (B4) > Static Structural (B5) > Solution (B6) > Total Deformation

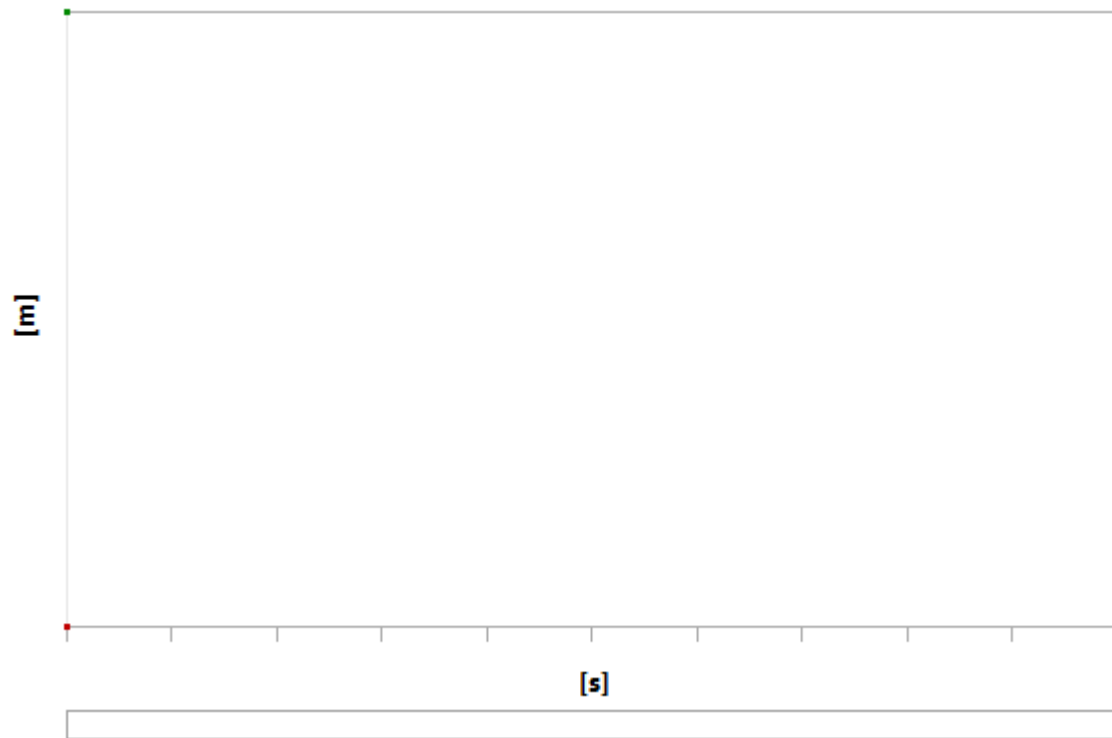


TABLE 21
Model (B4) > Static Structural (B5) > Solution (B6) > Total Deformation

Time [s]	Minimum [m]	Maximum [m]
1.	0.	2.3703

FIGURE 3
Model (B4) > Static Structural (B5) > Solution (B6) > Total Deformation > Image

B: Static Structural

Total Deformation

Type: Total Deformation

Unit: m

Time: 1

06/06/2019 12:04 p. m.

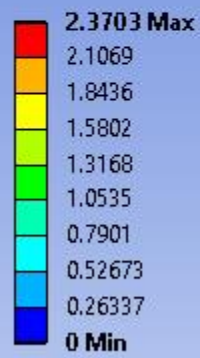


FIGURE 4
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Elastic Strain

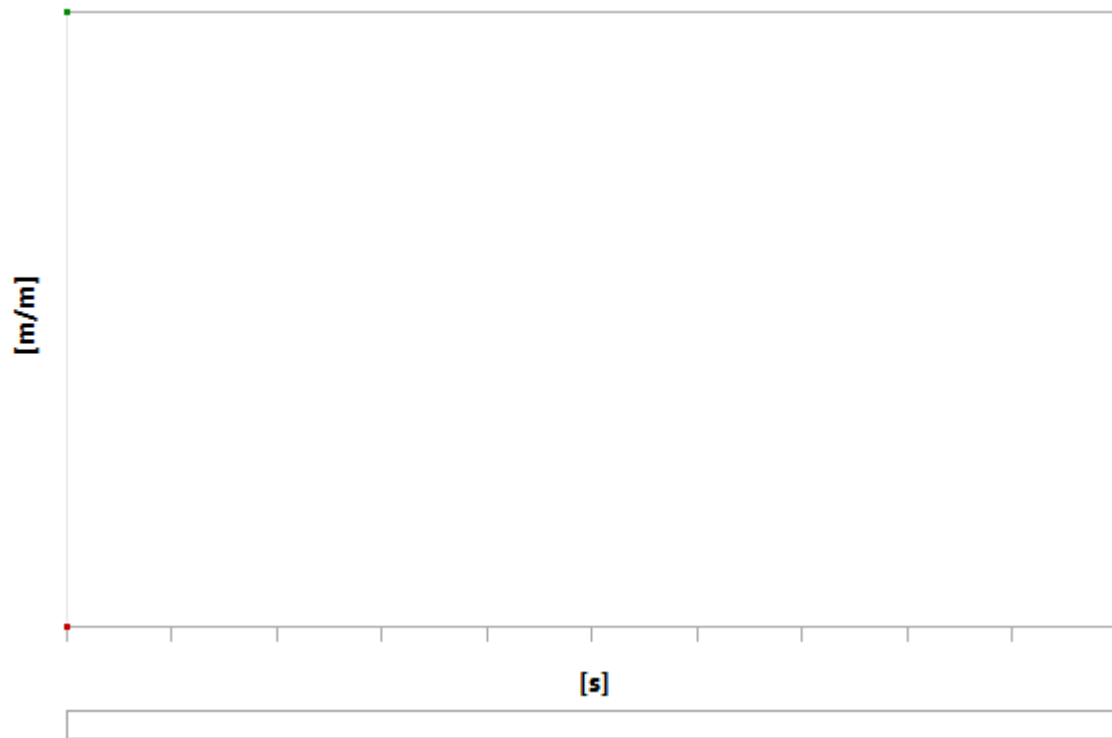


TABLE 22
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Elastic Strain

Time [s]	Minimum [m/m]	Maximum [m/m]
1.	0.	4.9516e-005

FIGURE 5
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Elastic Strain > Image

B: Static Structural

Equivalent Elastic Strain

Type: Equivalent Elastic Strain

Unit: m/m

Time: 1

06/06/2019 12:04 p. m.

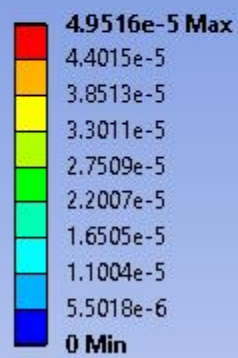


FIGURE 6
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress

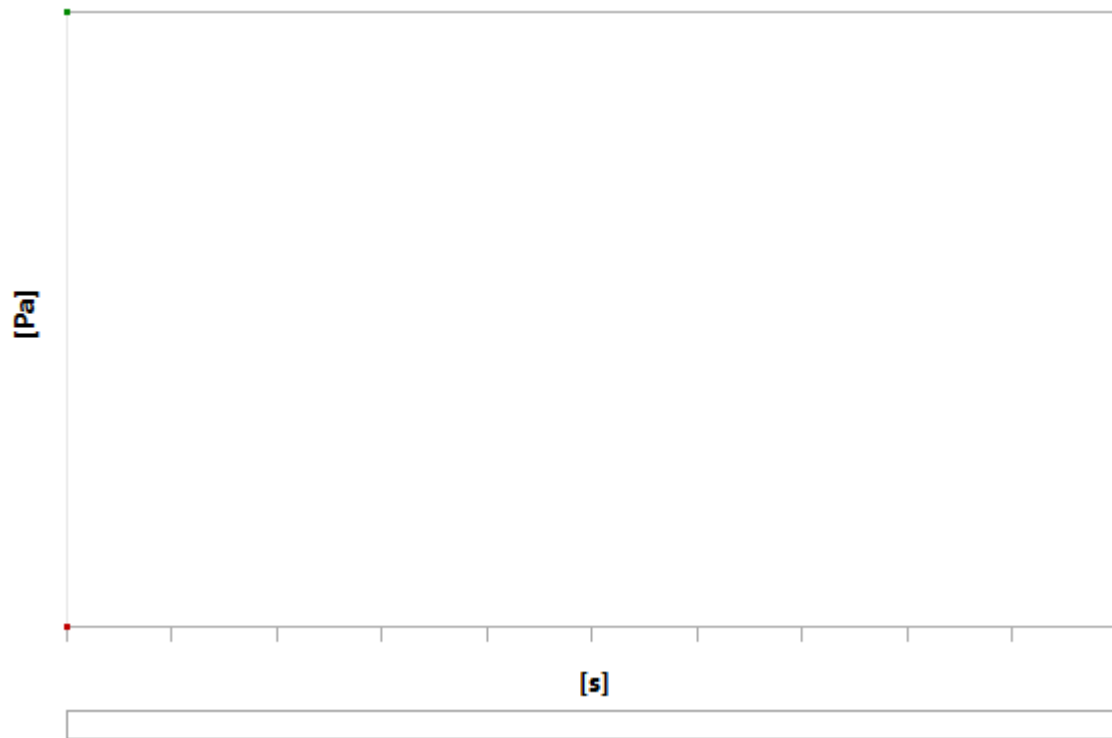


TABLE 23
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress

Time [s]	Minimum [Pa]	Maximum [Pa]
1.	0.	1.6678e+005

FIGURE 7
Model (B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress > Image

B: Static Structural

Equivalent Stress

Type: Equivalent (von-Mises) Stress

Unit: Pa

Time: 1

06/06/2019 12:05 p. m.

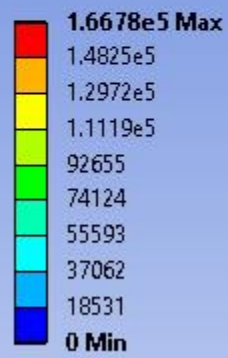


FIGURE 8
Model (B4) > Static Structural (B5) > Solution (B6) > Strain Energy

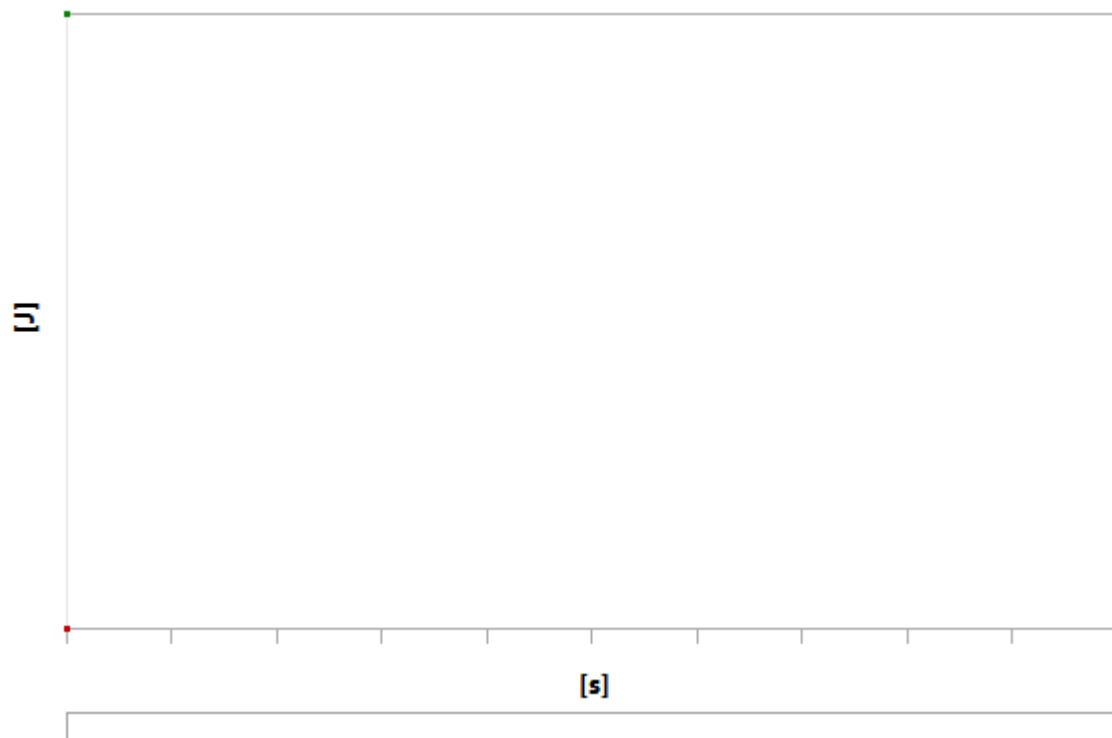


TABLE 24
Model (B4) > Static Structural (B5) > Solution (B6) > Strain Energy

Time [s]	Minimum [J]	Maximum [J]
1.	0.	3.675e-008

FIGURE 9
Model (B4) > Static Structural (B5) > Solution (B6) > Strain Energy > Image

B: Static Structural

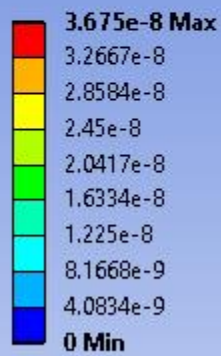
Strain Energy

Type: Strain Energy

Unit: J

Time: 1

06/06/2019 12:05 p. m.



Material Data

Polyethylene

TABLE 25
Polyethylene > Constants

Density	950 kg m ⁻³
Isotropic Secant Coefficient of Thermal Expansion	2.3e-004 C ⁻¹
Specific Heat	2300 J kg ⁻¹ C ⁻¹

Isotropic Thermal Conductivity	0.28 W m ⁻¹ C ⁻¹
--------------------------------	--

TABLE 26
Polyethylene > Appearance

Red	Green	Blue
130	154	176

TABLE 27
Polyethylene > Compressive Ultimate Strength

Compressive Ultimate Strength Pa
0

TABLE 28
Polyethylene > Compressive Yield Strength

Compressive Yield Strength Pa
0

TABLE 29
Polyethylene > Tensile Yield Strength

Tensile Yield Strength Pa
2.5e+007

TABLE 30
Polyethylene > Tensile Ultimate Strength

Tensile Ultimate Strength Pa
3.3e+007

TABLE 31
Polyethylene > Isotropic Secant Coefficient of Thermal Expansion

Zero-Thermal-Strain Reference Temperature C
22

TABLE 32
Polyethylene > Isotropic Elasticity

Temperature C	Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa
	1.1e+009	0.42	2.2917e+009	3.8732e+008

Structural Steel

TABLE 33
Structural Steel > Constants

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

TABLE 34
Structural Steel > Appearance

Red	Green	Blue
-----	-------	------

132	139	179
-----	-----	-----

TABLE 35
Structural Steel > Compressive Ultimate Strength

Compressive Ultimate Strength Pa
0

TABLE 36
Structural Steel > Compressive Yield Strength

Compressive Yield Strength Pa
2.5e+008

TABLE 37
Structural Steel > Tensile Yield Strength

Tensile Yield Strength Pa
2.5e+008

TABLE 38
Structural Steel > Tensile Ultimate Strength

Tensile Ultimate Strength Pa
4.6e+008

TABLE 39
Structural Steel > Isotropic Secant Coefficient of Thermal Expansion

Zero-Thermal-Strain Reference Temperature C
22

TABLE 40
Structural Steel > Alternating Stress Mean Stress

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

TABLE 41
Structural Steel > Strain-Life Parameters

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

TABLE 42
Structural Steel > Isotropic Elasticity

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

TABLE 43
Structural Steel > Isotropic Relative Permeability

Relative Permeability
10000