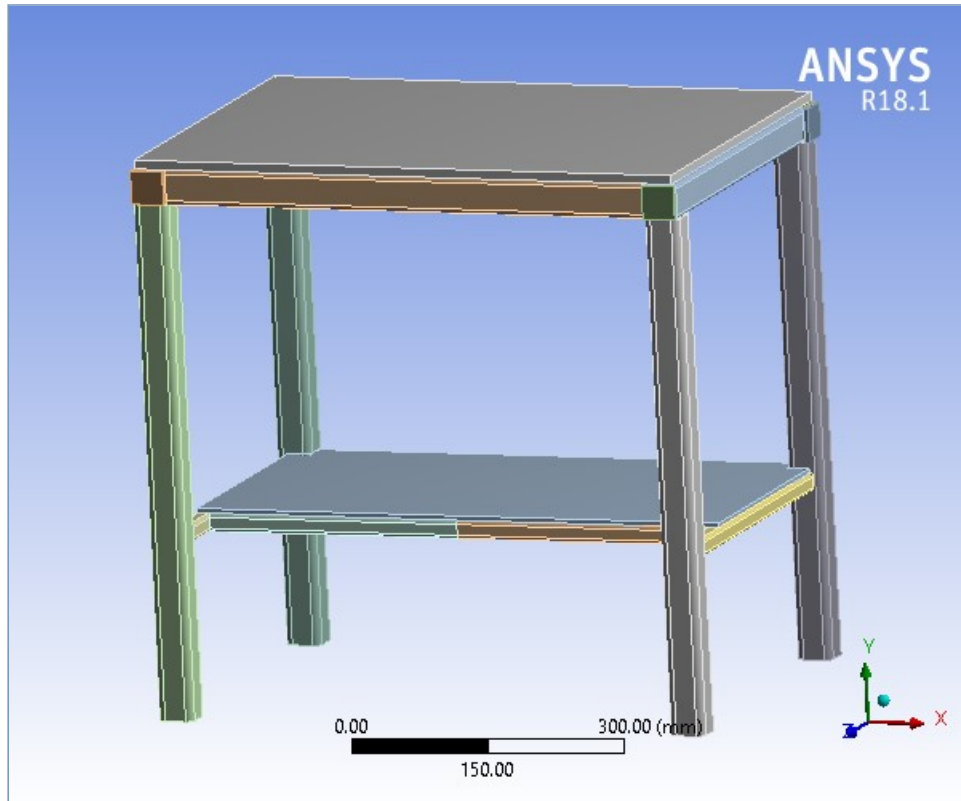




Project

First Saved	Wednesday, April 11, 2018
Last Saved	Wednesday, April 11, 2018
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 (mm, t, N, s, mV, mA) Degrees rad/s Celsius
Angle	Degrees
Rotational Velocity	rad/s
Temperature	Celsius

Model (A4)

Geometry

TABLE 2
Model (A4) > Geometry

Object Name	Geometry
State	Fully Defined
Definition	
Source	D:\backup\Project\Sample\Table\Table 3 v2.x_t
Type	Parasolid
Length Unit	Meters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	645. mm
Length Y	630. mm
Length Z	450. mm
Properties	
Volume	6.0161e+006 mm ³
Mass	9.6252e-004 t
Scale Factor Value	1.
Statistics	
Bodies	20
Active Bodies	20
Nodes	35225
Elements	5565
Mesh Metric	None

Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	No
Parameters	Independent
Parameter Key	ANS;DS
Attributes	No
Named Selections	No
Material Properties	No
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	No
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Attach File Via Temp File	Yes
Temporary Directory	C:\Users\ELCOT\AppData\Local\Temp
Analysis Type	3-D
Mixed Import Resolution	None
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

TABLE 3
Model (A4) > Geometry > Parts

Object Name	Part 1	Part 2	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 9	Part 10	Part 11
State	Meshed										
Graphics Properties											
Visible	Yes										
Transparency	1										
Definition											
Suppressed	No										
Stiffness Behavior	Flexible										
Coordinate System	Default Coordinate System										
Reference Temperature	By Environment										
Behavior	None										
Material											
Assignment	Balsa										
Nonlinear Effects	Yes										
Thermal Strain Effects	Yes										
Bounding Box											
Length X	629.6 mm	612. mm	20. mm	290. mm	20. mm	560. mm	20. mm	37.4 mm	5. mm	37.4 mm	
Length Y	10. mm	5. mm	20. mm						37.4 mm		
Length Z	440. mm	312. mm	280. mm	20. mm	360. mm	20. mm	360. mm	5. mm	37.4 mm	5. mm	
Properties											
Volume	2.7702e+006 mm³	9.4796e+005 mm³	37436 mm³	38773 mm³		48132 mm³	74872 mm³	48132 mm³	6993.8 mm³		
Mass	4.4321e-004 t	1.5166e-004 t	5.9893e-006 t	6.2033e-006 t		7.7006e-006 t	1.1979e-005 t	7.7006e-006 t	1.1189e-006 t		
Centroid X	0. mm	-1.2509e-013 mm	1.4104e-015 mm	145. mm	-145. mm	300. mm	1.7781e-013 mm	-300. mm		322.5 mm	300. mm
Centroid Y	25. mm	-387.5 mm	-400. mm						-7.8849e-017 mm	0. mm	-7.8849e-017 mm
Centroid Z	0. mm	-48.98 mm	-50. mm	100. mm	-8.8274e-015 mm	-200. mm	0. mm	-222.5 mm	-200. mm	222.5 mm	
Moment of Inertia Ip1	7.1542 t·mm²	1.2171 t·mm²	3.9313e-002 t·mm²	6.3904e-004 t·mm²		8.3296e-002 t·mm²	1.234e-003 t·mm²	8.3296e-002 t·mm²	1.3276e-004 t·mm²	2.6085e-004 t·mm²	1.3276e-004 t·mm²
Moment of Inertia Ip2	21.791 t·mm²	5.8913 t·mm²	3.9313e-002 t·mm²	4.3654e-002 t·mm²		8.3296e-002 t·mm²	0.31266 t·mm²	8.3296e-002 t·mm²	1.3276e-004 t·mm²		
Moment of Inertia Ip3	14.644 t·mm²	4.6749 t·mm²	6.1701e-004 t·mm²	4.3654e-002 t·mm²		7.933e-004 t·mm²	0.31266 t·mm²	7.933e-004 t·mm²	2.6085e-004 t·mm²	1.3276e-004 t·mm²	2.6085e-004 t·mm²

Statistics								
Nodes	1288	1005	1782	1759	1884	2453	1884	315
Elements	165	126	286	297	336	405	336	36
Mesh Metric	None							

TABLE 4
Model (A4) > Geometry > Parts

Object Name	Part 12	Part 13	Part 14	Part 15	Part 16	Part 17	Part 18	Part 19	Part 20
State	Meshed								
Graphics Properties									
Visible	Yes								
Transparency	1								
Definition									
Suppressed	No								
Stiffness Behavior	Flexible								
Coordinate System	Default Coordinate System								
Reference Temperature	By Environment								
Behavior	None								
Material									
Assignment	Balsa								
Nonlinear Effects	Yes								
Thermal Strain Effects	Yes								
Bounding Box									
Length X	37.4 mm	40. mm			600. mm	40. mm			560. mm
Length Y	37.4 mm	580. mm	40. mm	580. mm	40. mm	580. mm	40. mm	580. mm	40. mm
Length Z	5. mm	40. mm	440. mm	40. mm			400. mm	40. mm	
Properties									
Volume	6993.8 mm³	3.1018e+005 mm³	1.6348e+005 mm³	3.1018e+005 mm³	2.2293e+005 mm³	3.1018e+005 mm³	1.4862e+005 mm³	3.1018e+005 mm³	2.0807e+005 mm³
Mass	1.1189e-006 t	4.9626e-005 t	2.6156e-005 t	4.9626e-005 t	3.5667e-005 t	4.9626e-005 t	2.3778e-005 t	4.9626e-005 t	3.3289e-005 t
Centroid X	-300. mm			300. mm	20. mm	300. mm		-300. mm	1.6316e-014 mm
Centroid Y	0. mm	-310. mm	1.0477e-016 mm	-310. mm	-1.1835e-015 mm	-310. mm	-1.5345e-015 mm	-310. mm	2.2174e-016 mm
Centroid Z	222.5 mm	-200. mm	-6.9218e-015 mm	-200. mm		200. mm	20. mm	200. mm	
Moment of Inertia Ip1	1.3276e-004 t·mm²	1.3969 t·mm²	0.42708 t·mm²	1.3969 t·mm²	1.6174e-002 t·mm²	1.3969 t·mm²	0.32181 t·mm²	1.3972 t·mm²	1.5096e-002 t·mm²
Moment of Inertia Ip2	1.3276e-004 t·mm²	2.0449e-002 t·mm²	0.42708 t·mm²	2.0449e-002 t·mm²	1.076 t·mm²	2.0449e-002 t·mm²	0.32181 t·mm²	2.0456e-002 t·mm²	0.8758 t·mm²
Moment of Inertia Ip3	2.6085e-004 t·mm²	1.3969 t·mm²	1.1861e-002 t·mm²	1.3969 t·mm²	1.076 t·mm²	1.3969 t·mm²	1.0783e-002 t·mm²	1.3972 t·mm²	0.8758 t·mm²
Statistics									
Nodes	315	2476	2472	2476	2808	2476	2304	2476	2640
Elements	36	448	336	448	384	448	312	448	360
Mesh Metric	None								

Coordinate Systems

TABLE 5
Model (A4) > Coordinate Systems > Coordinate System

Object Name	Global Coordinate System
State	Fully Defined
Definition	
Type	Cartesian
Coordinate System ID	0.
Origin	
Origin X	0. mm
Origin Y	0. mm

Origin Z	0. mm
Directional Vectors	
X Axis Data	[1. 0. 0.]
Y Axis Data	[0. 1. 0.]
Z Axis Data	[0. 0. 1.]

Connections

TABLE 6
Model (A4) > Connections

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

TABLE 7
Model (A4) > 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	2.5192 mm
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	36
Active Connections	36

TABLE 8
Model (A4) > 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										2 Faces
Target	2 Faces	3 Faces	2 Faces	3 Faces		2 Faces				3 Faces	
Contact Bodies	Part 1				Part 2						
Target Bodies	Part 14	Part 16	Part 18	Part 20	Part 3	Part 4	Part 5	Part 6	Part 7	Part 8	Part 13
Definition											
Type	Bonded										
Scope Mode	Automatic										
Behavior	Program Controlled										
Trim Contact	Program Controlled										
Trim Tolerance	2.5192 mm										
Suppressed	No										
Advanced											
Formulation	Program Controlled										
Detection	Program Controlled										

Method	
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 9
Model (A4) > 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	2 Faces					1 Face					
Target	3 Faces				1 Face	3 Faces			1 Face		
Contact Bodies	Part 2	Part 3			Part 4		Part 5	Part 6		Part 7	
Target Bodies	Part 15	Part 4	Part 5	Part 7	Part 5	Part 6	Part 8	Part 15	Part 17	Part 13	Part 15
Definition											
Type	Bonded										
Scope Mode	Automatic										
Behavior	Program Controlled										
Trim Contact	Program Controlled										
Trim Tolerance	2.5192 mm										
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 (A4) > 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	Geometry Selection										

Method											
Contact	1 Face						3 Faces			1 Face	
Target	1 Face					3 Faces		1 Face		3 Faces	
Contact Bodies	Part 8		Part 9	Part 10	Part 11	Part 12	Part 13	Part 14		Part 15	
Target Bodies	Part 13	Part 19	Part 14	Part 16	Part 18	Part 14		Part 16	Part 19	Part 20	Part 16
Definition											
Type	Bonded										
Scope Mode	Automatic										
Behavior	Program Controlled										
Trim Contact	Program Controlled										
Trim Tolerance	2.5192 mm										
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 (A4) > Connections > Contacts > Contact Regions

Object Name	Contact Region 34	Contact Region 35	Contact Region 36
State	Fully Defined		
Scope			
Scoping Method	Geometry Selection		
Contact	3 Faces	1 Face	3 Faces
Target	1 Face	3 Faces	1 Face
Contact Bodies	Part 16	Part 17	Part 18
Target Bodies	Part 18		Part 20
Definition			
Type	Bonded		
Scope Mode	Automatic		
Behavior	Program Controlled		
Trim Contact	Program Controlled		
Trim Tolerance	2.5192 mm		
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 12

Model (A4) > 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	Coarse
Automatic Mesh Based Defeaturing	On
Defeature Size	Default
Minimum Edge Length	3.14160 mm
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	35225
Elements	5565

Static Structural (A5)

TABLE 13
Model (A4) > Analysis

Object Name	<i>Static Structural (A5)</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 14
Model (A4) > Static Structural (A5) > Analysis Settings

Object Name	<i>Analysis Settings</i>
State	Fully Defined

Step Controls	
Number Of Steps	10.
Current Step Number	10.
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 Miscellaneous	No
General Miscellaneous	No
Store Results At	All Time Points
Analysis Data Management	
Solver Files Directory	C:\Users\ELCOT\AppData\Local\Temp\WB_LENVOVO_ELCOT_27852_2\unsaved_project_files\dp0\SYSTMCH\
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	nmm

TABLE 15
Model (A4) > Static Structural (A5) > Analysis Settings
Step-Specific "Step Controls"

Step	Step End Time
1	0.1 s
2	0.2 s
3	0.3 s
4	0.4 s
5	0.5 s
6	0.6 s
7	0.7 s
8	0.8 s
9	0.9 s
10	1. s

TABLE 16
Model (A4) > Static Structural (A5) > Loads

Object Name	Fixed Support	Force
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	4 Faces	1 Face

Definition		
Type	Fixed Support	Force
Suppressed	No	
Define By		Vector
Magnitude		Tabular Data
Direction		Defined
Tabular Data		
Independent Variable		Time

FIGURE 1
Model (A4) > Static Structural (A5) > Force

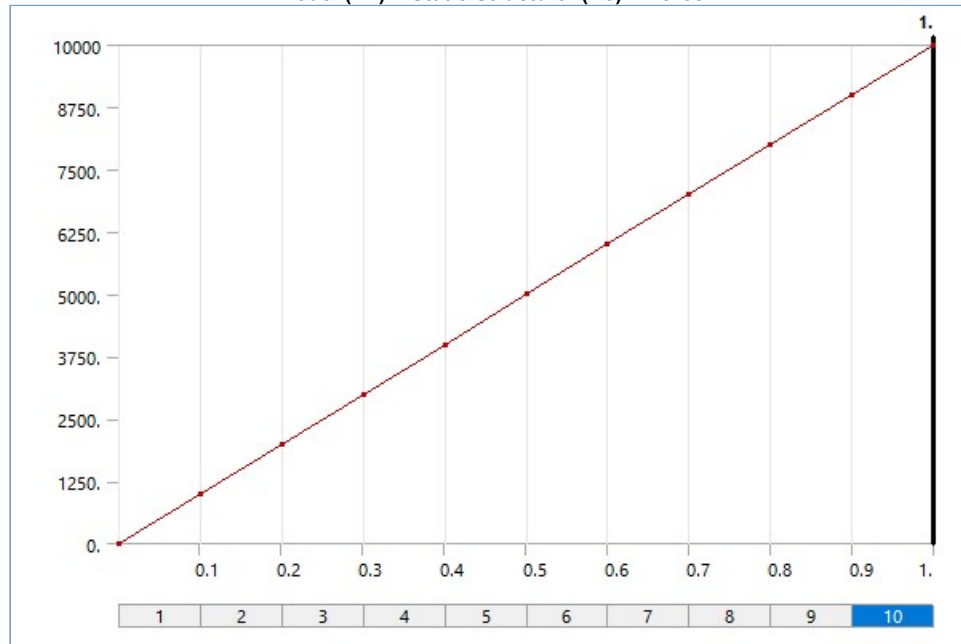


TABLE 17
Model (A4) > Static Structural (A5) > Force

Steps	Time [s]	Force [N]
1	0.	0.
	0.1	1000.
2	0.2	2000.
3	0.3	3000.
4	0.4	4000.
5	0.5	5000.
6	0.6	6000.
7	0.7	7000.
8	0.8	8000.
9	0.9	9000.
10	1.	10000

Solution (A6)

TABLE 18
Model (A4) > Static Structural (A5) > Solution

Object Name	Solution (A6)
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	3 m 51 s
MAPDL Memory Used	713. MB
MAPDL Result File Size	57.063 MB
Post Processing	

Beam Section Results	No
----------------------	----

TABLE 19
Model (A4) > Static Structural (A5) > Solution (A6) > 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 (A4) > Static Structural (A5) > Solution (A6) > Results

Object Name	Total Deformation	Equivalent Elastic Strain	Equivalent Stress
State	Solved		
Scope			
Scoping Method	Geometry Selection		
Geometry	All Bodies		
Definition			
Type	Total Deformation	Equivalent Elastic Strain	Equivalent (von-Mises) Stress
By	Time		
Display Time	Last		
Calculate Time History	Yes		
Identifier			
Suppressed	No		
Results			
Minimum	0. mm	7.1341e-006 mm/mm	1.5544e-002 MPa
Maximum	7.3257 mm	8.8305e-003 mm/mm	67.233 MPa
Minimum Occurs On	Part 13	Part 3	
Maximum Occurs On	Part 1	Part 14	
Minimum Value Over Time			
Minimum	0. mm	6.9484e-007 mm/mm	1.4495e-003 MPa
Maximum	0. mm	7.1341e-006 mm/mm	1.5544e-002 MPa
Maximum Value Over Time			
Minimum	0.73298 mm	8.7264e-004 mm/mm	6.6246 MPa
Maximum	7.3257 mm	8.8305e-003 mm/mm	67.233 MPa
Information			
Time	1. s		
Load Step	10		
Substep	1		
Iteration Number	10		
Integration Point Results			
Display Option		Averaged	
Average Across Bodies		No	

FIGURE 2
Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation

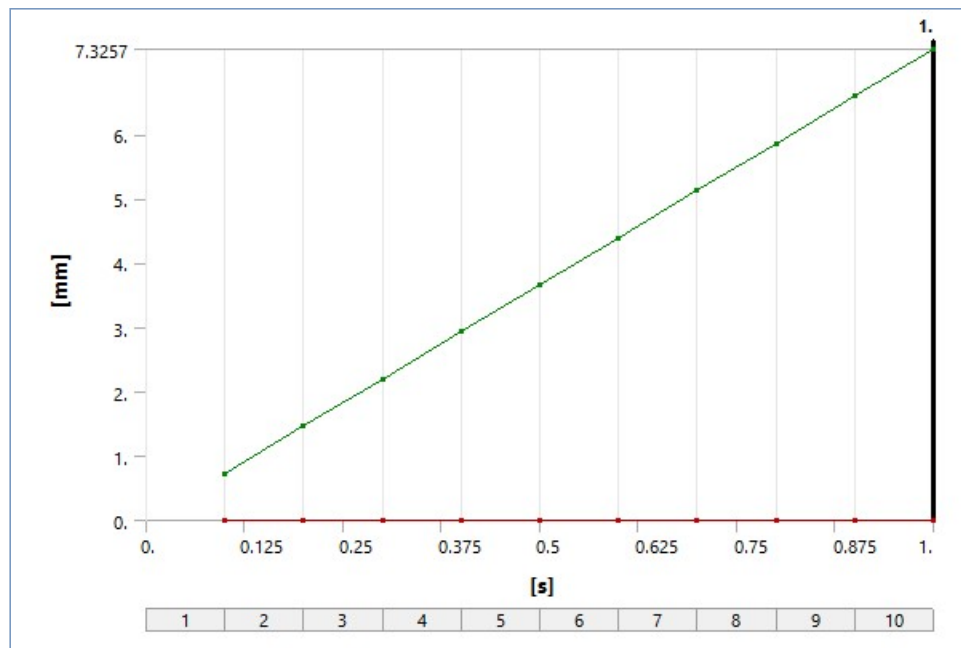


TABLE 21
Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation

Time [s]	Minimum [mm]	Maximum [mm]
0.1	0.	0.73298
0.2		1.4654
0.3		2.1978
0.4		2.9303
0.5		3.6628
0.6		4.3953
0.7		5.1278
0.8		5.8604
0.9		6.5931
1.		7.3257

FIGURE 3
Model (A4) > Static Structural (A5) > Solution (A6) > Total Deformation > Figure

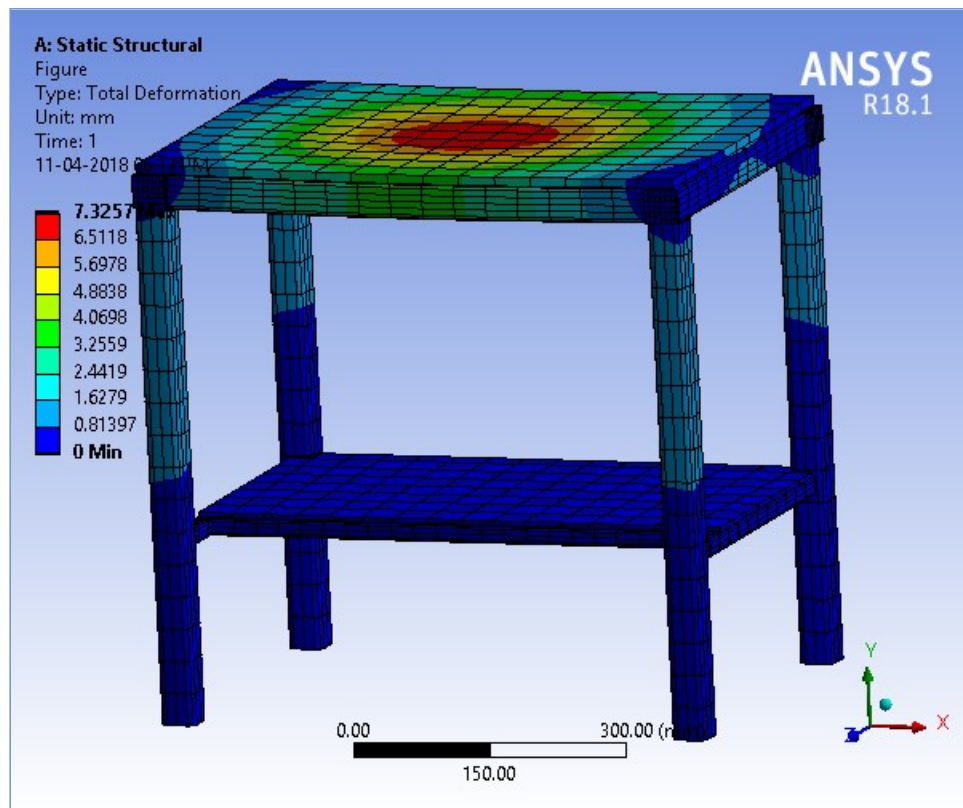


FIGURE 4
 Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain

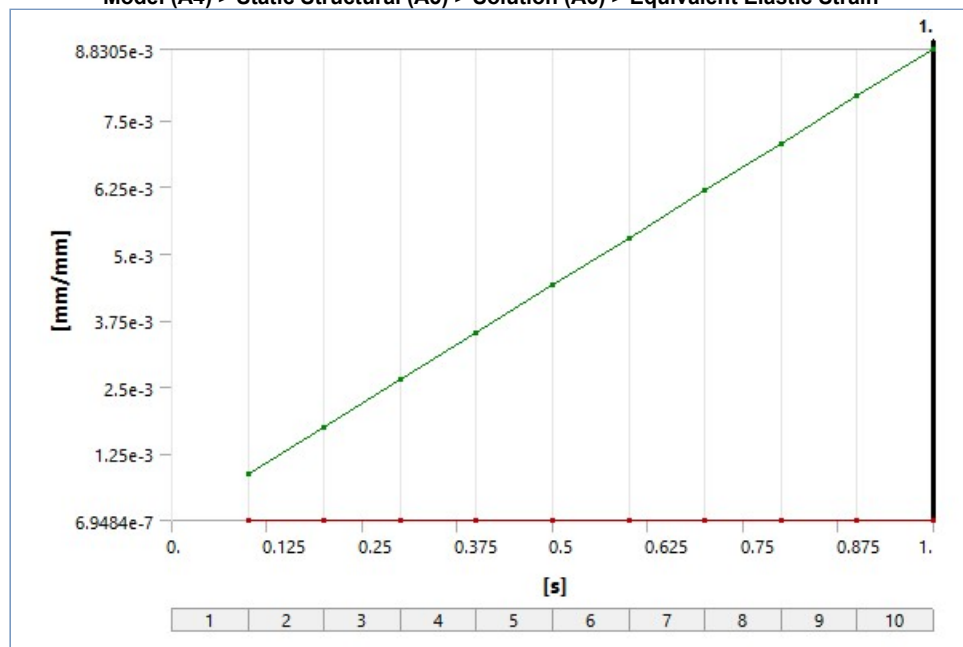


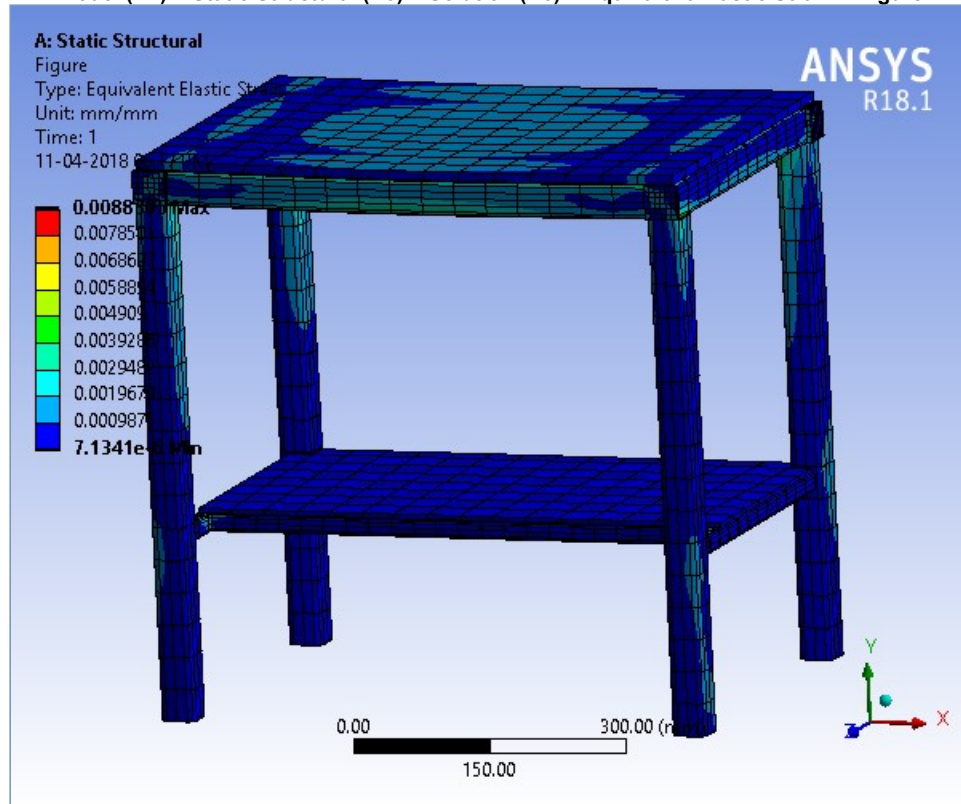
TABLE 22
 Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain

Time [s]	Minimum [mm/mm]	Maximum [mm/mm]
0.1	6.9484e-007	8.7264e-004
0.2	1.4103e-006	1.755e-003
0.3	2.1255e-006	2.6394e-003
0.4	2.8408e-006	3.5238e-003
0.5	3.5562e-006	4.4082e-003
0.6	4.2716e-006	5.2926e-003

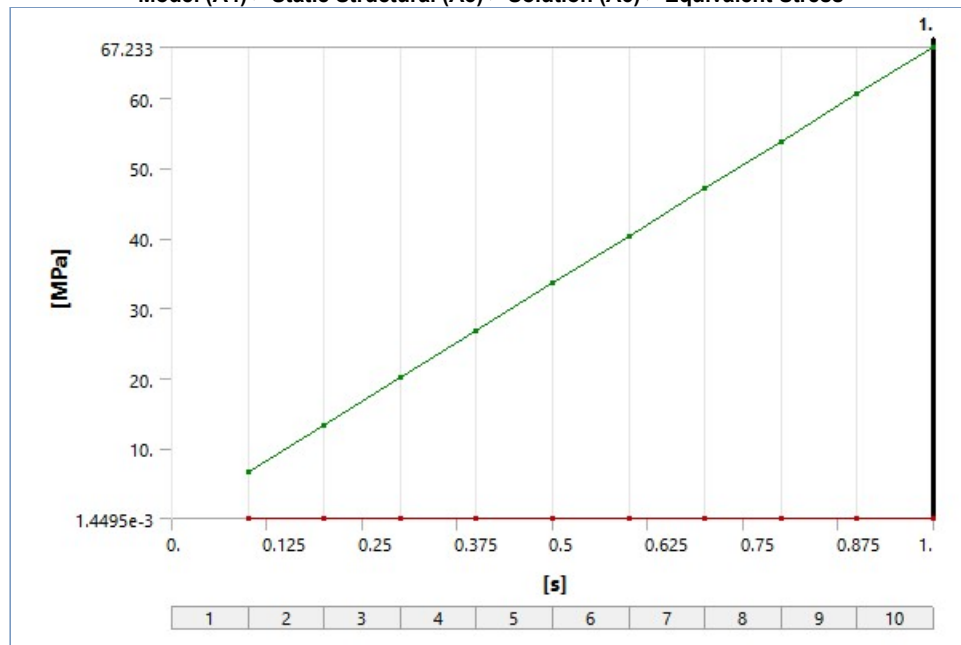
0.7	4.9871e-006	6.1771e-003
0.8	5.7027e-006	7.0616e-003
0.9	6.4184e-006	7.946e-003
1.	7.1341e-006	8.8305e-003

FIGURE 5

Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Elastic Strain > Figure

**FIGURE 6**

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

**TABLE 23**

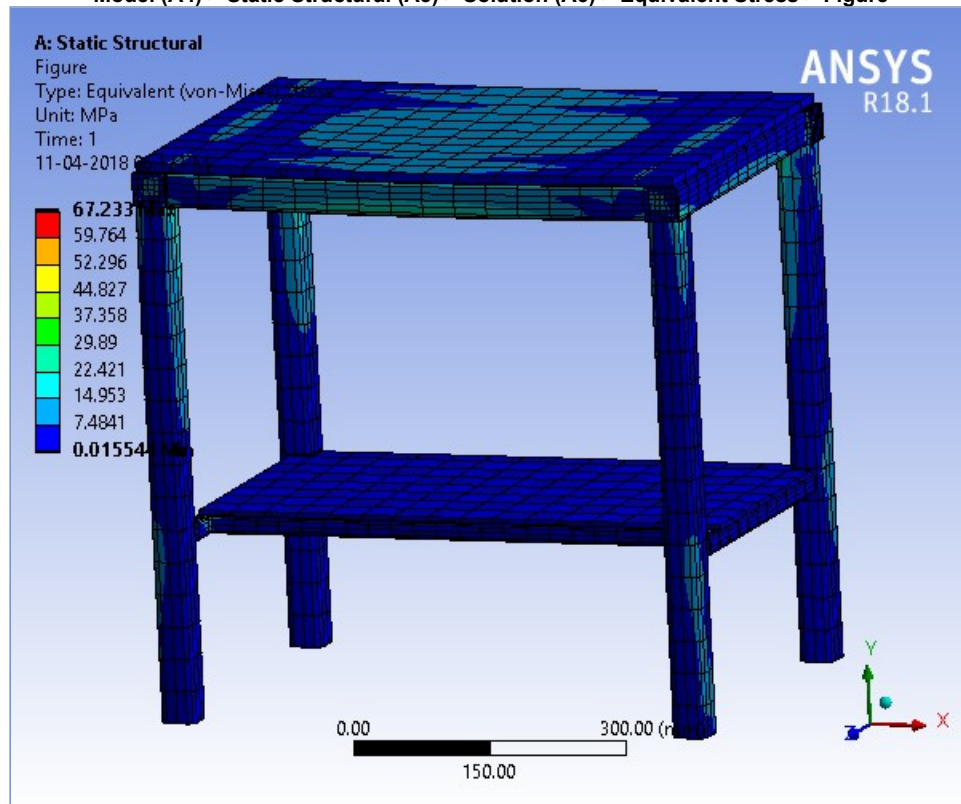
Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress

Time [s]	Minimum [MPa]	Maximum [MPa]
----------	---------------	---------------

0.1	1.4495e-003	6.6246
0.2	3.0125e-003	13.338
0.3	4.5778e-003	20.068
0.4	6.1438e-003	26.805
0.5	7.7101e-003	33.542
0.6	9.2767e-003	40.28
0.7	1.0843e-002	47.018
0.8	1.241e-002	53.756
0.9	1.3977e-002	60.494
1.	1.5544e-002	67.233

FIGURE 7

Model (A4) > Static Structural (A5) > Solution (A6) > Equivalent Stress > Figure



Material Data

Balsa

TABLE 24

Balsa > Constants

Density	1.5999e-010 tonne mm ⁻³
---------	------------------------------------

TABLE 25

Balsa > Appearance

Red	Green	Blue
103	192	205

TABLE 26

Balsa > Isotropic Elasticity

Temperature C	Young's Modulus MPa	Poisson's Ratio	Bulk Modulus MPa	Shear Modulus MPa
	7740	0.29	6142.9	3000