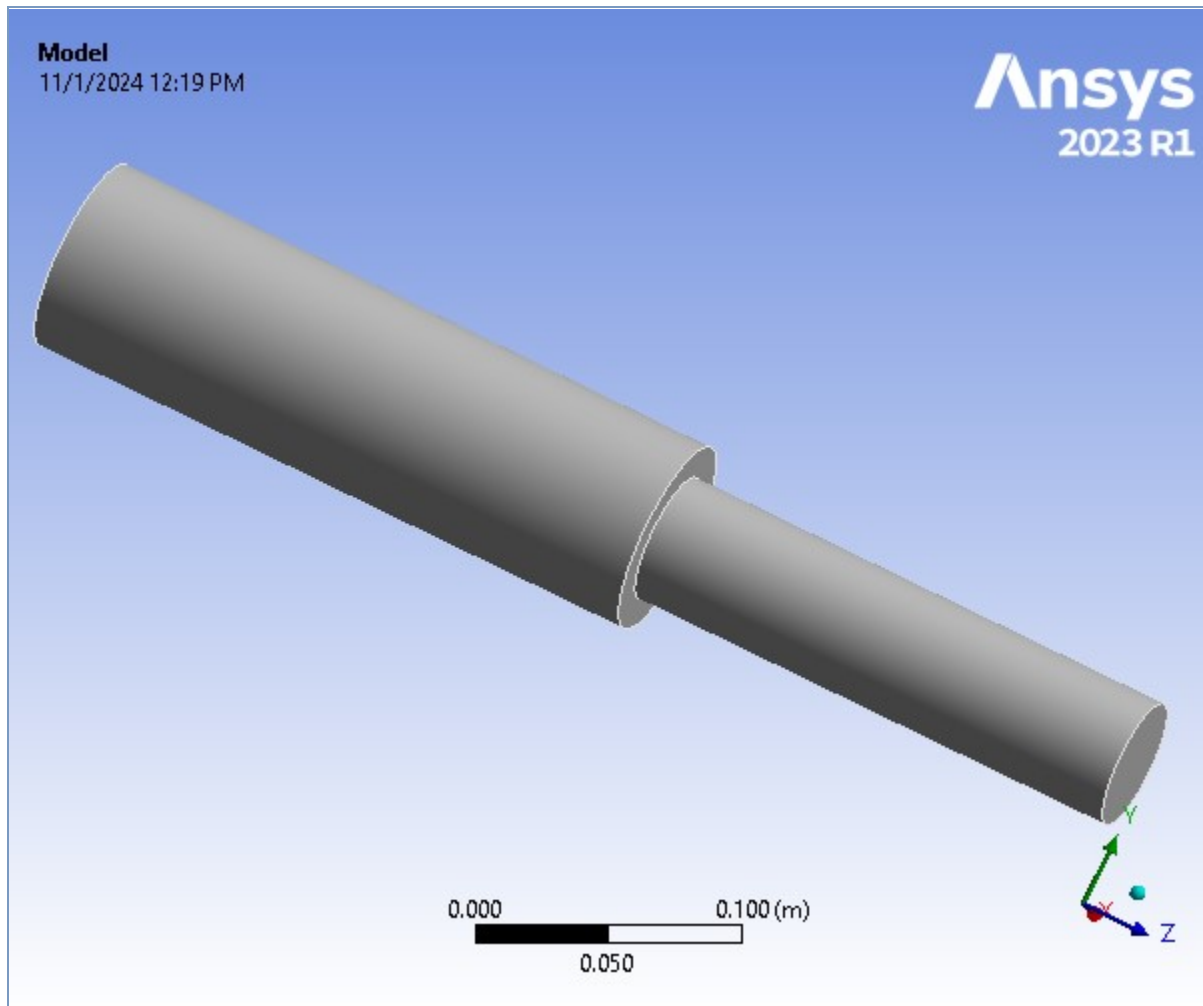




Project

First Saved	Sunday, May 15, 2022
Last Saved	Tuesday, May 17, 2022
Product Version	2022 R1
Save Project Before Solution	No
Save Project After Solution	No



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- [Model \(A4, B4\)](#)
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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 (A4, B4)

TABLE 2	
Model (A4, B4) > Geometry Imports	

Object Name	<i>Geometry Imports</i>
State	Solved

TABLE 3
Model (A4, B4) > Geometry Imports > Geometry Import (A3, B3)

Object Name	<i>Geometry Import (A3, B3)</i>
State	Solved
Definition	
Source	D:\Ansys Practicals\samarth malgave\CAE EXP 06 TEMEC21359 \Exp06_Samarth_Malgave_TEMEC21359_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Basic Geometry Options	
Parameters	Independent
Parameter Key	
Advanced Geometry Options	
Compare Parts On Update	No
Analysis Type	3-D

Geometry

TABLE 4
Model (A4, B4) > Geometry

Object Name	<i>Geometry</i>
State	Fully Defined
Definition	
Source	D:\Ansys Practicals\samarth malgave\CAE EXP 06 TEMEC21359 \Exp06_Samarth_Malgave_TEMEC21359_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Length Unit	Meters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	7.5e-002 m
Length Y	7.5e-002 m
Length Z	0.45 m
Properties	
Volume	1.4972e-003 m ³
Mass	11.753 kg
Scale Factor Value	1.
Statistics	
Bodies	1
Active Bodies	1
Nodes	21856
Elements	19836
Mesh Metric	None
Update Options	
Assign Default Material	No
Basic Geometry Options	
Parameters	Independent
Parameter Key	
Attributes	Yes

Attribute Key	
Named Selections	Yes
Named Selection Key	
Material Properties	Yes
Advanced Geometry Options	
Use Associativity	Yes
Coordinate Systems	Yes
Coordinate System Key	
Reader Mode Saves Updated File	No
Use Instances	Yes
Smart CAD Update	Yes
Compare Parts On Update	No
Analysis Type	3-D
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	None
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

TABLE 5
Model (A4, B4) > Geometry > Parts

Object Name	<i>Solid</i>
State	Meshed
Graphics Properties	
Visible	Yes
Transparency	1
Definition	
Suppressed	No
Stiffness Behavior	Flexible
Coordinate System	Default Coordinate System
Reference Temperature	By Environment
Treatment	None
Material	
Assignment	Structural Steel
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	7.5e-002 m
Length Y	7.5e-002 m
Length Z	0.45 m
Properties	
Volume	1.4972e-003 m ³
Mass	11.753 kg
Centroid X	-2.3693e-019 m
Centroid Y	-5.9752e-019 m
Centroid Z	0.18402 m

Moment of Inertia Ip1	0.17319 kg·m ²
Moment of Inertia Ip2	0.17319 kg·m ²
Moment of Inertia Ip3	6.9881e-003 kg·m ²
Statistics	
Nodes	21856
Elements	19836
Mesh Metric	None

TABLE 6
Model (A4, B4) > Materials

Object Name	<i>Materials</i>
State	Fully Defined
Statistics	
Materials	1
Material Assignments	0

Coordinate Systems

TABLE 7
Model (A4, B4) > Coordinate Systems > Coordinate System

Object Name	<i>Global Coordinate System</i>
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.]

Mesh

TABLE 8
Model (A4, B4) > Mesh

Object Name	<i>Mesh</i>
State	Solved
Display	
Display Style	Use Geometry Setting
Defaults	
Physics Preference	Mechanical
Element Order	Linear
Element Size	Default
Sizing	
Use Adaptive Sizing	Yes
Resolution	Default (2)
Mesh Defeaturing	Yes
Defeature Size	Default
Transition	Fast

Span Angle Center	Coarse
Initial Size Seed	Assembly
Bounding Box Diagonal	0.46233 m
Average Surface Area	1.9799e-002 m ²
Minimum Edge Length	0.15708 m
Quality	
Check Mesh Quality	Yes, Errors
Error Limits	Aggressive Mechanical
Target Element Quality	Default (5.e-002)
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	
Rigid Body Behavior	Dimensionally Reduced
Triangle Surface Mesher	Program Controlled
Topology Checking	Yes
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	21856
Elements	19836
Show Detailed Statistics	No

TABLE 9
Model (A4, B4) > Mesh > Mesh Controls

Object Name	<i>Sweep Method</i>
State	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	1 Body
Definition	
Suppressed	No
Method	Sweep
Algorithm	Axisymmetric
Mesh In Center	Hexahedra
Element Order	Linear
Source Scoping Method	Program Controlled
O-Grid Divisions	10
Element Option	Solid
Control Messages	Yes, Click To Display...
Advanced	
Mesh Based Defeaturing	Off
Project Corners to Top	Yes

Steady-State Thermal (A5)

TABLE 10
Model (A4, B4) > Analysis

Object Name	<i>Steady-State Thermal (A5)</i>
State	License Conflict
Definition	
Physics Type	Thermal
Analysis Type	Steady-State
Solver Target	Mechanical APDL
Options	
Generate Input Only	No

TABLE 11
Model (A4, B4) > Steady-State Thermal (A5) > Initial Condition

Object Name	<i>Initial Temperature</i>
State	Fully Defined
Definition	
Initial Temperature	Uniform Temperature
Initial Temperature Value	22. °C

TABLE 12
Model (A4, B4) > Steady-State Thermal (A5) > 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
Solver Pivot Checking	Program Controlled
Radiosity Controls	
Radiosity Solver	Program Controlled
Flux Convergence	1.e-004
Maximum Iteration	1000.
Solver Tolerance	0.1 W/m ²
Over Relaxation	0.1
Hemicube Resolution	10.
Nonlinear Controls	
Heat Convergence	Program Controlled
Temperature Convergence	Program Controlled
Line Search	Program Controlled
Advanced	
Contact Split (DMP)	Off
Output Controls	
Calculate Thermal Flux	Yes
Contact Data	Yes
Nodal Forces	No

Volume and Energy	Yes
Euler Angles	Yes
General Miscellaneous	No
Contact Miscellaneous	No
Store Results At	All Time Points
Result File Compression	Program Controlled
Analysis Data Management	
Solver Files Directory	D:\Ansys Practicals\samarth malgave\CAE EXP 06 TEMEC21359 \Exp06_Samarth_Malgave_TEMEC21359_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	mks

TABLE 13
Model (A4, B4) > Steady-State Thermal (A5) > Loads

Object Name	Temperature	Temperature 2
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	1 Face	
Definition		
Type	Temperature	
Magnitude	100. °C (ramped)	300. °C (ramped)
Suppressed	No	

FIGURE 1
Model (A4, B4) > Steady-State Thermal (A5) > Temperature

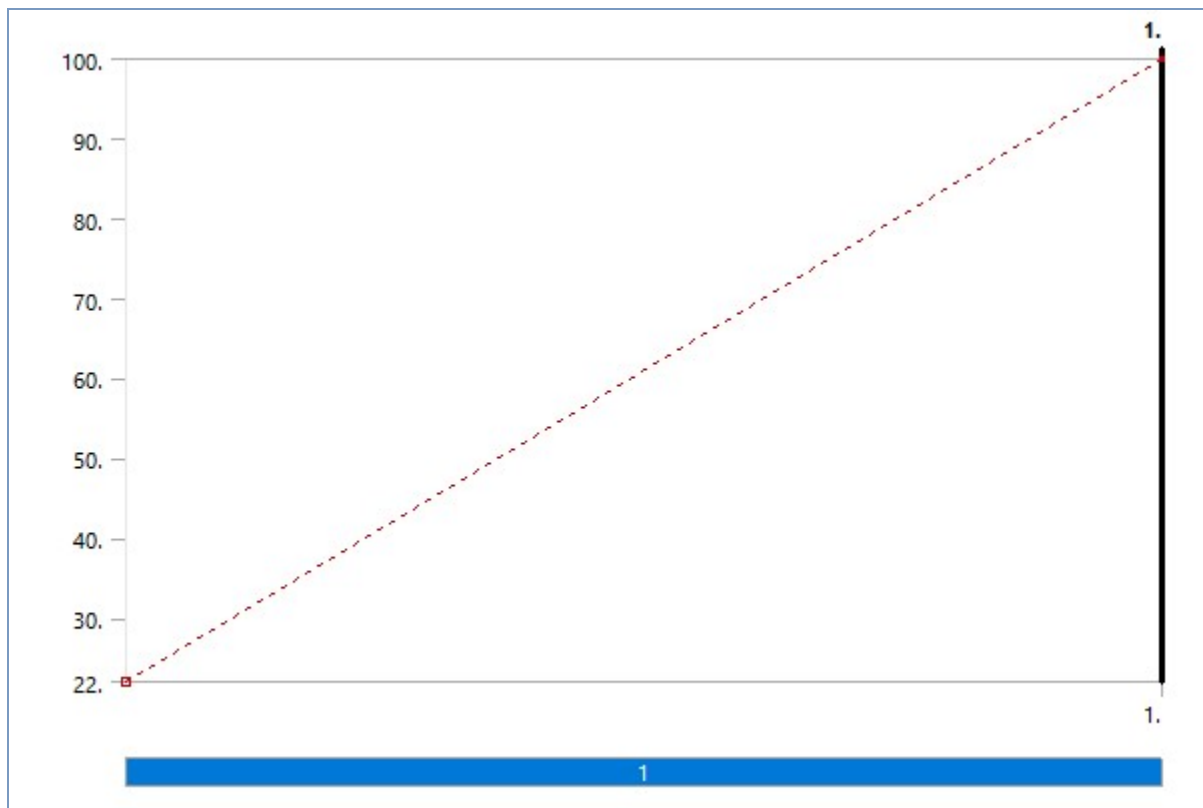
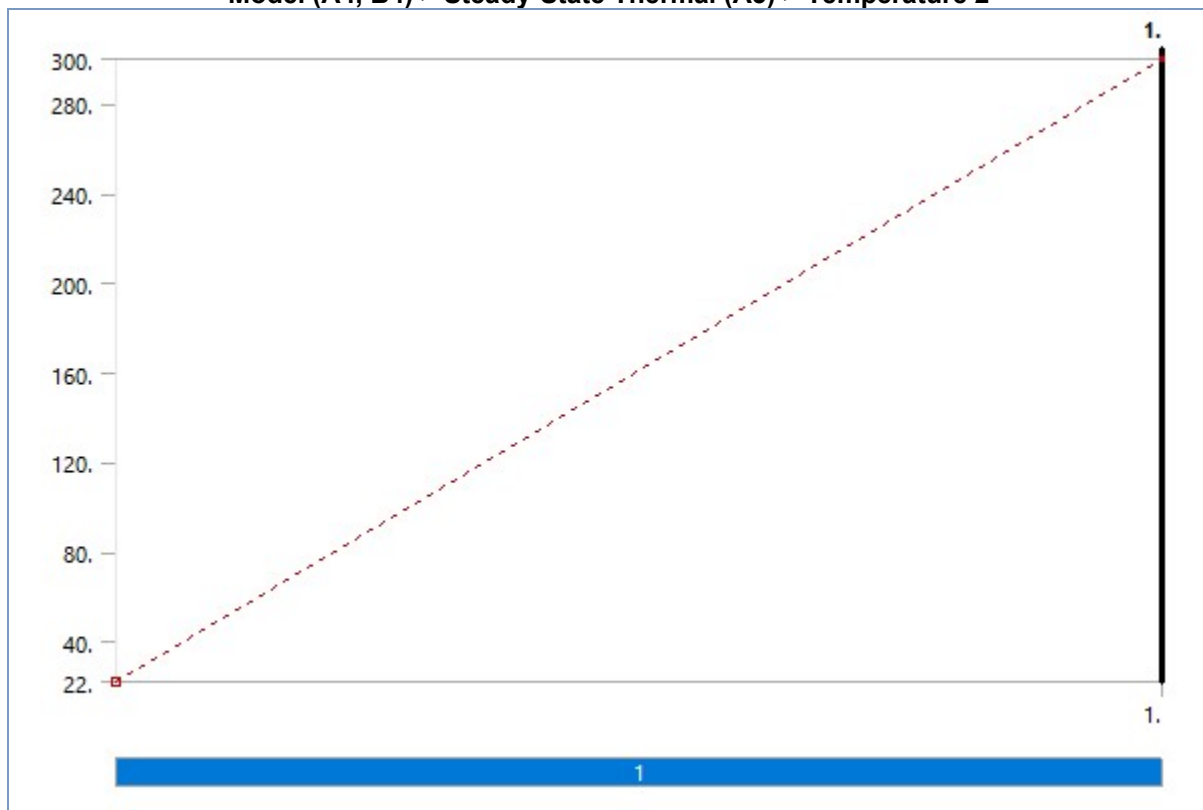


FIGURE 2
Model (A4, B4) > Steady-State Thermal (A5) > Temperature 2



Solution (A6)

TABLE 14
Model (A4, B4) > Steady-State Thermal (A5) > Solution

Object Name	<i>Solution (A6)</i>
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	38. s
MAPDL Memory Used	303. MB
MAPDL Result File Size	7.875 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 15
Model (A4, B4) > Steady-State Thermal (A5) > Solution (A6) > Solution Information

Object Name	<i>Solution Information</i>
State	Solved
Solution Information	
Solution Output	Solver Output
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 16
Model (A4, B4) > Steady-State Thermal (A5) > Solution (A6) > Results

Object Name	<i>Temperature</i>
State	License Conflict
Scope	
Scoping Method	Geometry Selection
Geometry	All Bodies
Definition	
Type	Temperature
By	Time
Display Time	Last
Separate Data by Entity	No
Calculate Time History	Yes
Identifier	
Suppressed	No
Results	
Minimum	100. °C
Maximum	300. °C
Average	223.45 °C
Minimum Occurs On	Solid

Maximum Occurs On	Solid
Information	
Time	1. s
Load Step	1
Substep	1
Iteration Number	1

FIGURE 3
Model (A4, B4) > Steady-State Thermal (A5) > Solution (A6) > Temperature

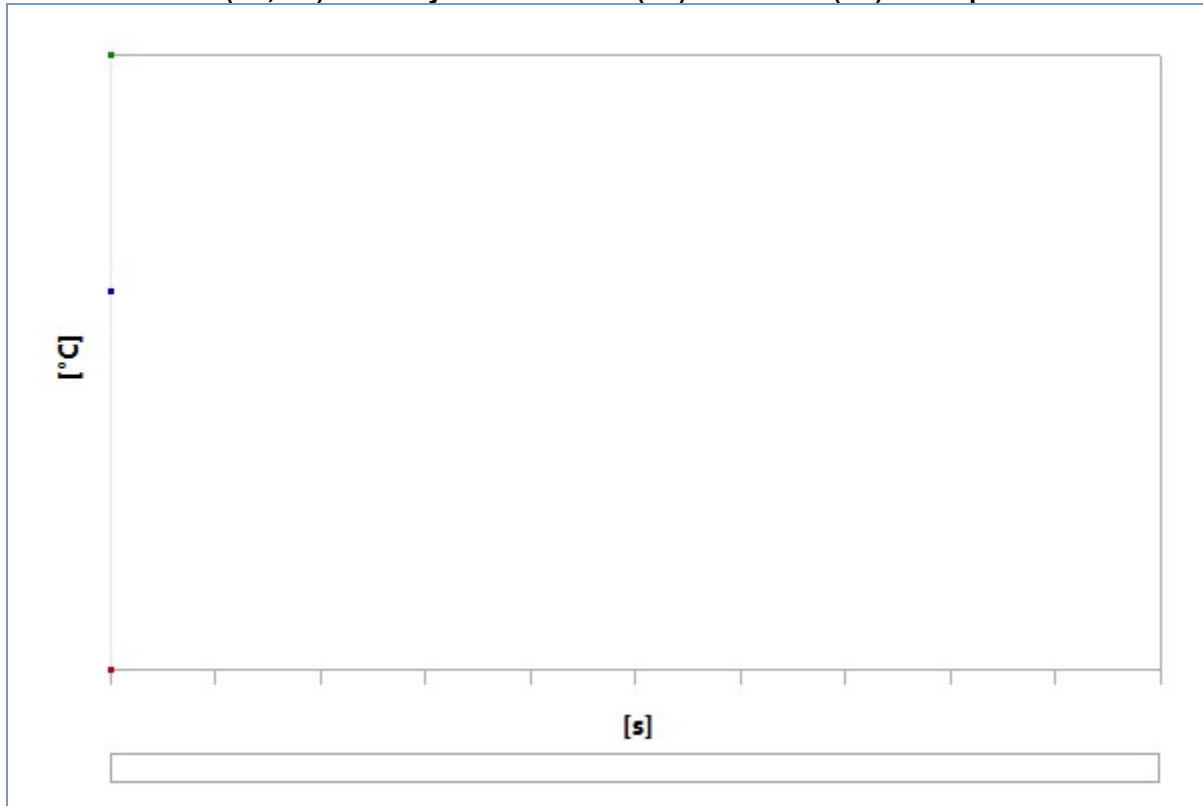


TABLE 17
Model (A4, B4) > Steady-State Thermal (A5) > Solution (A6) > Temperature

Time [s]	Minimum [°C]	Maximum [°C]	Average [°C]
1.	100.	300.	223.45

Static Structural (B5)

TABLE 18
Model (A4, B4) > Analysis

Object Name	<i>Static Structural (B5)</i>
State	License Conflict
Definition	
Physics Type	Structural
Analysis Type	Static Structural
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 19
Model (A4, 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
Inertia Relief	Off
Quasi-Static Solution	Off
Restart Controls	
Generate Restart Points	Program Controlled
Retain Files After Full Solve	No
Combine Restart Files	Program Controlled
Nonlinear Controls	
Force Convergence	Program Controlled
Moment Convergence	Program Controlled
Displacement Convergence	Program Controlled
Rotation Convergence	Program Controlled
Line Search	Program Controlled
Advanced	
Inverse Option	No
Contact Split (DMP)	Off
Output Controls	
Stress	Yes
Back Stress	No
Strain	Yes
Contact Data	Yes
Nonlinear Data	No
Nodal Forces	No
Volume and Energy	Yes
Euler Angles	Yes
General Miscellaneous	No
Contact Miscellaneous	No
Store Results At	All Time Points
Result File Compression	Program Controlled
Analysis Data Management	
Solver Files Directory	D:\Ansys Practicals\samarth malgave\CAE EXP 06 TEMEC21359 \Exp06_Samarth_Malgave_TEMEC21359_files\dp0\SYS-1\MECH\

Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Nonlinear Solution	No
Solver Units	Active System
Solver Unit System	mks

TABLE 20
Model (A4, B4) > Static Structural (B5) > Loads

Object Name	<i>Fixed Support</i>	<i>Force</i>
State	Fully Defined	
Scope		
Scoping Method	Geometry Selection	
Geometry	1 Face	
Definition		
Type	Fixed Support	Force
Suppressed	No	
Define By		Vector
Applied By	Surface Effect	
Magnitude	1258. N (ramped)	
Direction		Defined

FIGURE 4
Model (A4, B4) > Static Structural (B5) > Force

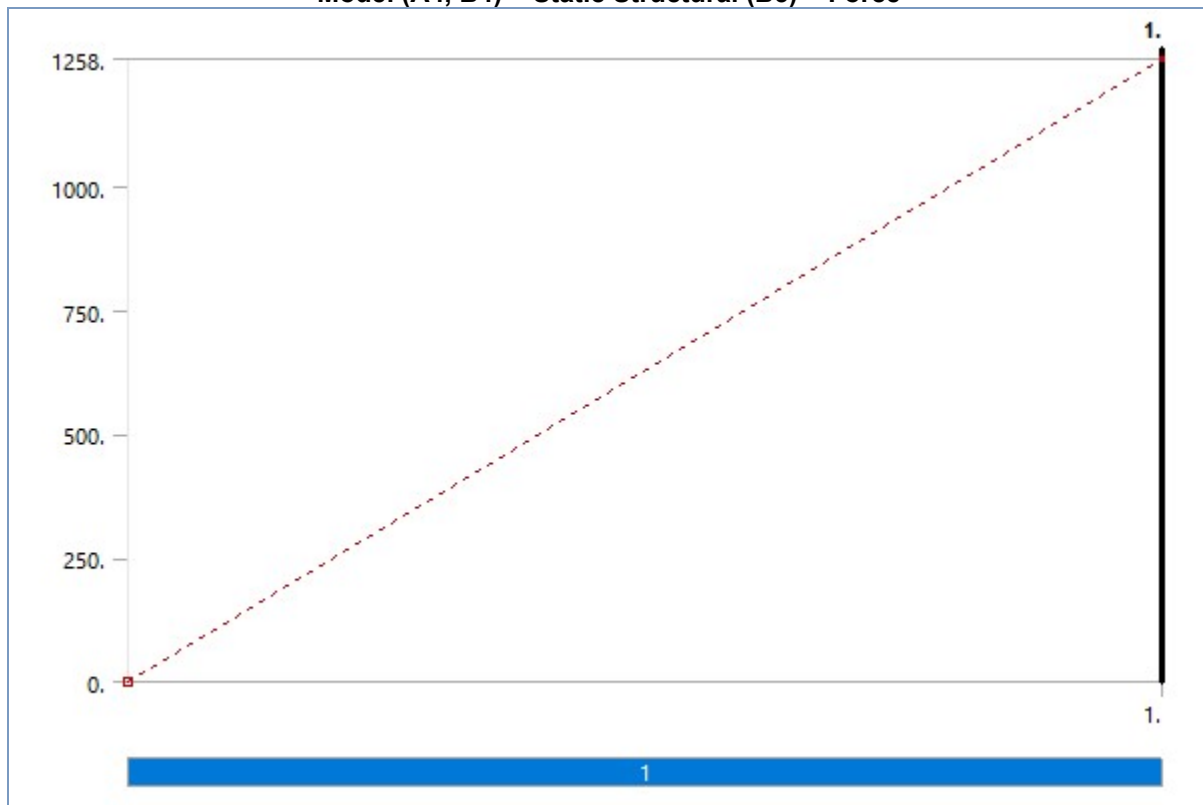


TABLE 21

Model (A4, B4) > Static Structural (B5) > Imported Load (A6)

Object Name	<i>Imported Load (A6)</i>
State	Fully Defined
Definition	
Type	Imported Data
Interpolation Type	Mechanical Results Transfer
Suppressed	No
Source	Solution
Data Management	
Delete Mapped Data Files	Yes

TABLE 22**Model (A4, B4) > Static Structural (B5) > Imported Load (A6) > Imported Body Temperature**

Object Name	<i>Imported Body Temperature</i>
State	Solved
Scope	
Scoping Method	Geometry Selection
Geometry	1 Body
Definition	
Type	Imported Body Temperature
Tabular Loading	Program Controlled
Suppressed	No
Source Environment	Steady-State Thermal (A5)
Source Time	Worksheet

Model (A4, B4) > Static Structural (B5) > Imported Load (A6) > Imported Body Temperature

	Source Time (s)	Analysis Time (s)
1	End Time	1

Solution (B6)**TABLE 23****Model (A4, 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	35. s
MAPDL Memory Used	217. MB
MAPDL Result File Size	17.688 MB
Post Processing	
Beam Section Results	No
On Demand Stress/Strain	No

TABLE 24**Model (A4, 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 25
Model (A4, B4) > Static Structural (B5) > Solution (B6) > Results

Object Name	Equivalent Stress	Total Deformation
State	Solved	
Scope		
Scoping Method	Geometry Selection	
Geometry	All Bodies	
Definition		
Type	Equivalent (von-Mises) Stress	Total Deformation
By	Time	
Display Time	Last	
Separate Data by Entity	No	
Calculate Time History	Yes	
Identifier		
Suppressed	No	
Integration Point Results		
Display Option	Averaged	
Average Across Bodies	No	
Results		
Minimum	40888 Pa	0. m
Maximum	1.2587e+009 Pa	1.092e-003 m
Average	5.1533e+007 Pa	6.2482e-004 m
Minimum Occurs On	Solid	
Maximum Occurs On	Solid	
Information		
Time	1. s	
Load Step	1	
Substep	1	
Iteration Number	1	

FIGURE 5
Model (A4, B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress

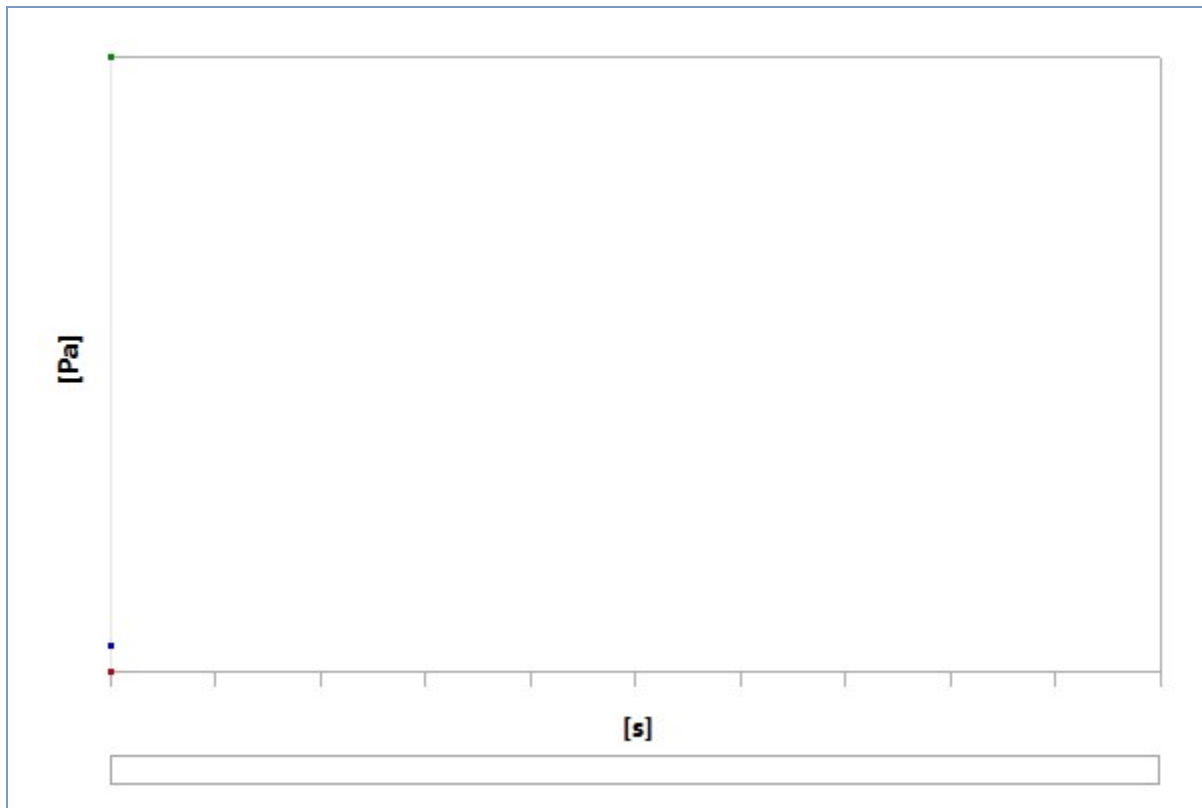


TABLE 26
Model (A4, B4) > Static Structural (B5) > Solution (B6) > Equivalent Stress

Time [s]	Minimum [Pa]	Maximum [Pa]	Average [Pa]
1.	40888	1.2587e+009	5.1533e+007

FIGURE 6
Model (A4, B4) > Static Structural (B5) > Solution (B6) > Total Deformation

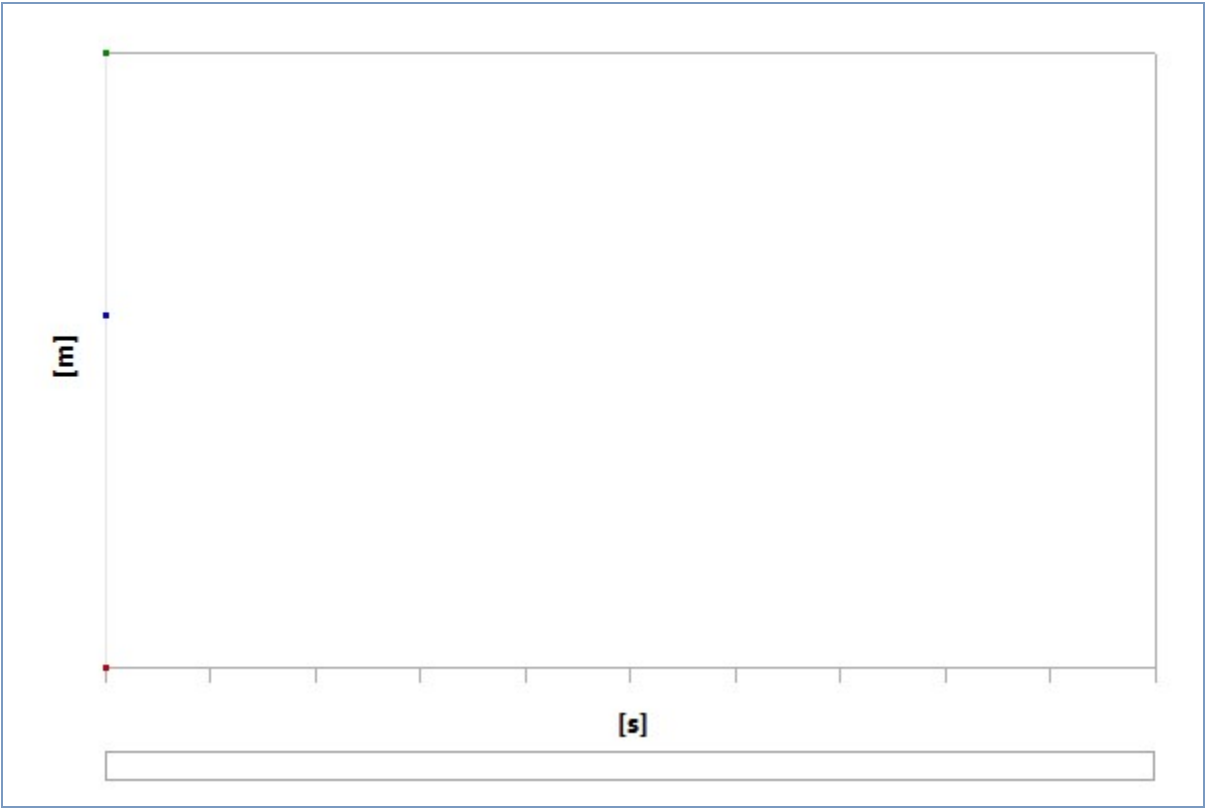


TABLE 27
Model (A4, B4) > Static Structural (B5) > Solution (B6) > Total Deformation

Time [s]	Minimum [m]	Maximum [m]	Average [m]
1.	0.	1.092e-003	6.2482e-004

Material Data

Structural Steel

TABLE 28
Structural Steel > Constants

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

TABLE 29
Structural Steel > Color

Red	Green	Blue
132	139	179

TABLE 30
Structural Steel > Compressive Ultimate Strength

Compressive Ultimate Strength Pa
0

TABLE 31

Structural Steel > Compressive Yield Strength

Compressive Yield Strength Pa
2.5e+008

TABLE 32**Structural Steel > Tensile Yield Strength**

Tensile Yield Strength Pa
2.5e+008

TABLE 33**Structural Steel > Tensile Ultimate Strength**

Tensile Ultimate Strength Pa
4.6e+008

TABLE 34**Structural Steel > Isotropic Secant Coefficient of Thermal Expansion**

Zero-Thermal-Strain Reference Temperature C
22

TABLE 35**Structural Steel > S-N Curve**

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 36**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 37**Structural Steel > Isotropic Elasticity**

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

TABLE 38**Structural Steel > Isotropic Relative Permeability**

Relative Permeability
10000