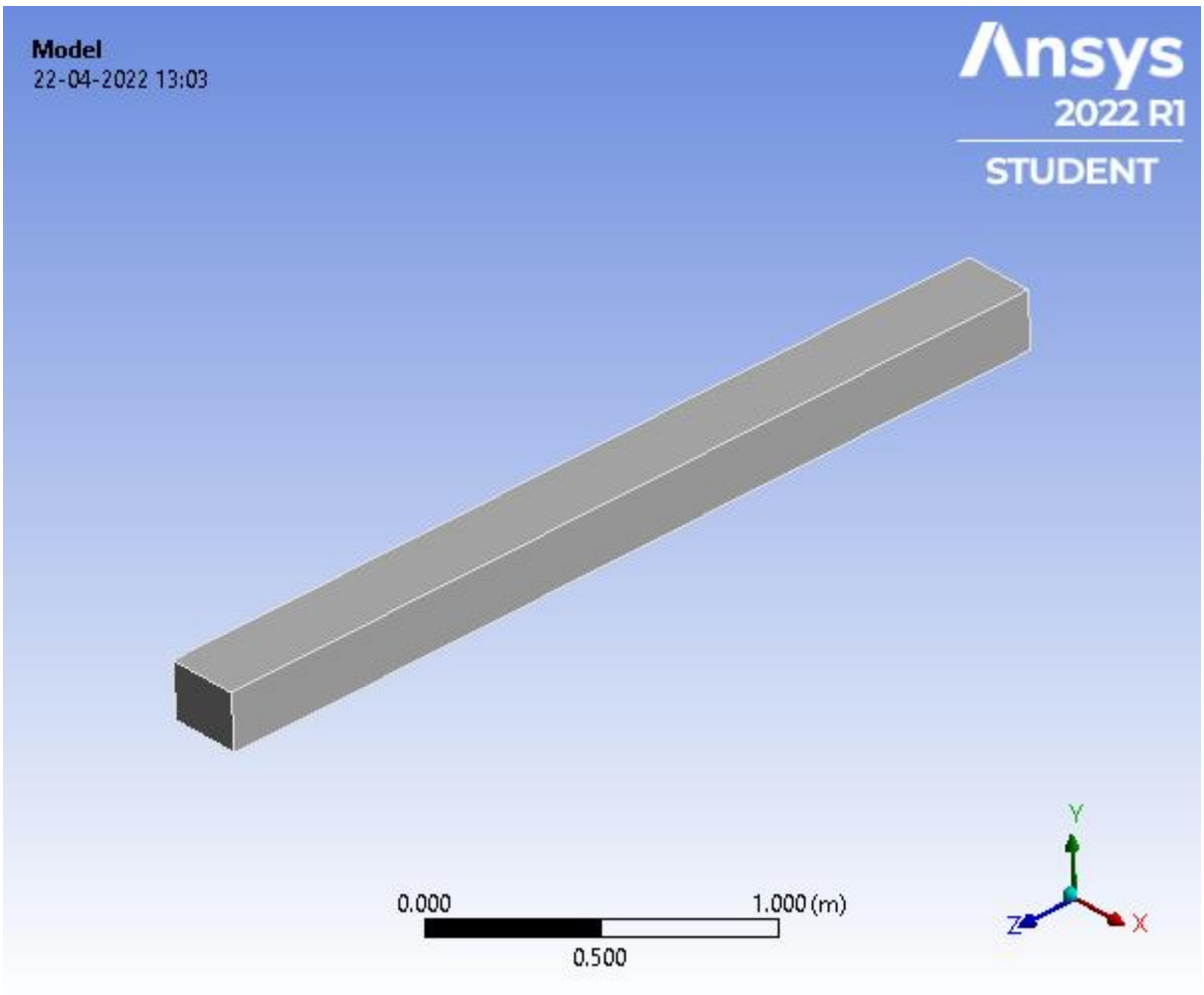
Project

First Saved	Monday, April 4, 2022
Last Saved	Wednesday, April 6, 2022
Product Version	2022 R1
Save Project Before Solution	No
Save Project After Solution	No



Contents

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)

TABLE 2
Model (A4) > Geometry Imports

Object Name	*Geometry Imports*
State	Solved

TABLE 3
Model (A4) > Geometry Imports > Geometry Import (A3)

Object Name	*Geometry Import (A3)*
State	Solved
Definition	
Source	C:\Users\HP\AppData\Local\Temp\WB_HP_9064_2\wbnew_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Basic Geometry Options	
Solid Bodies	Yes
Surface Bodies	Yes
Line Bodies	Yes
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
Compare Parts Tolerance	Tight
Analysis Type	3-D
Mixed Import Resolution	None
Import Facet Quality	Source
Clean Bodies On Import	No
Stitch Surfaces On Import	None
Stitch Tolerance	0.0000001
Decompose Disjoint Geometry	Yes
Enclosure and Symmetry Processing	Yes

Geometry

TABLE 4
Model (A4) > Geometry

Object Name	*Geometry*
State	Fully Defined
Definition	
Source	C:\Users\HP\AppData\Local\Temp\WB_HP_9064_2\wbnew_files\dp0\SYS\DM\SYS.agdb
Type	DesignModeler
Length Unit	Meters
Element Control	Program Controlled
Display Style	Body Color
Bounding Box	
Length X	0.25 m
Length Y	0.2 m
Length Z	3. m
Properties	
Volume	0.15 m³
Mass	270. kg
Scale Factor Value	1.
Statistics	
Bodies	1
Active Bodies	1
Nodes	30422
Elements	6300
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) > Geometry > Parts

Object Name	*Solid*
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	magnesium alloy
Nonlinear Effects	Yes
Thermal Strain Effects	Yes
Bounding Box	
Length X	0.25 m
Length Y	0.2 m

Length Z	3. m
Properties	
Volume	0.15 m³
Mass	270. kg
Centroid X	0.125 m
Centroid Y	0.1 m
Centroid Z	1.5 m
Moment of Inertia Ip1	203.4 kg·m²
Moment of Inertia Ip2	203.91 kg·m²
Moment of Inertia Ip3	2.3063 kg·m²
Statistics	
Nodes	30422
Elements	6300
Mesh Metric	None

TABLE 6
Model (A4) > Materials

Object Name	*Materials*
State	Fully Defined
Statistics	
Materials	2
Material Assignments	0

Coordinate Systems

TABLE 7
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. 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) > Mesh

Object Name	*Mesh*
State	Solved
Display	
Display Style	Use Geometry Setting
Defaults	
Physics Preference	Mechanical
Element Order	Program Controlled

Element Size	3.e-002 m
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	3.017 m
Average Surface Area	0.46667 m²
Minimum Edge Length	0.2 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	No
Rigid Body Behavior	Dimensionally Reduced
Triangle Surface Mesher	Program Controlled
Topology Checking	Yes
Pinch Tolerance	Please Define
Generate Pinch on Refresh	No
Statistics	
Nodes	30422
Elements	6300

Modal (A5)

TABLE 9
Model (A4) > Analysis

Object Name	*Modal (A5)*
State	Solved
Definition	
Physics Type	Structural
Analysis Type	Modal
Solver Target	Mechanical APDL
Options	
Environment Temperature	22. °C
Generate Input Only	No

TABLE 10
Model (A4) > Modal (A5) > Initial Condition

Object Name	*Pre-Stress (None)*
State	Fully Defined
Definition	
Pre-Stress Environment	None Available

TABLE 11
Model (A4) > Modal (A5) > Analysis Settings

Object Name	*Analysis Settings*
State	Fully Defined
Options	
Max Modes to Find	6
Limit Search to Range	No
On Demand Expansion	No
Solver Controls	
Damped	No
Solver Type	Program Controlled
Rotordynamics Controls	
Coriolis Effect	Off
Campbell Diagram	Off
Advanced	
Contact Split (DMP)	Off
Output Controls	
Stress	No
Surface Stress	No
Back Stress	No
Strain	No
Contact Data	No
Nodal Forces	No
Volume and Energy	No
Euler Angles	No
Calculate Reactions	No
General Miscellaneous	No
Result File Compression	Program Controlled
Analysis Data Management	
Solver Files Directory	C:\Users\HP\OneDrive\Desktop\mus_files\dp0\SYS\MECH\
Future Analysis	None
Scratch Solver Files Directory	
Save MAPDL db	No
Contact Summary	Program Controlled
Delete Unneeded Files	Yes
Solver Units	Active System
Solver Unit System	mks

TABLE 12
Model (A4) > Modal (A5) > Loads

Object Name	*Fixed Support 2*
State	Fully Defined
Scope	
Scoping Method	Geometry Selection
Geometry	1 Face
Definition	

Type	Fixed Support
Suppressed	No

Solution (A6)

TABLE 13
Model (A4) > Modal (A5) > Solution

Object Name	*Solution (A6)*
State	Solved
Adaptive Mesh Refinement	
Max Refinement Loops	1.
Refinement Depth	2.
Information	
Status	Done
MAPDL Elapsed Time	12. s
MAPDL Memory Used	1.6406 GB
MAPDL Result File Size	8.0625 MB
Post Processing	
Beam Section Results	No

The following bar chart indicates the frequency at each calculated mode.

FIGURE 1
Model (A4) > Modal (A5) > Solution (A6)

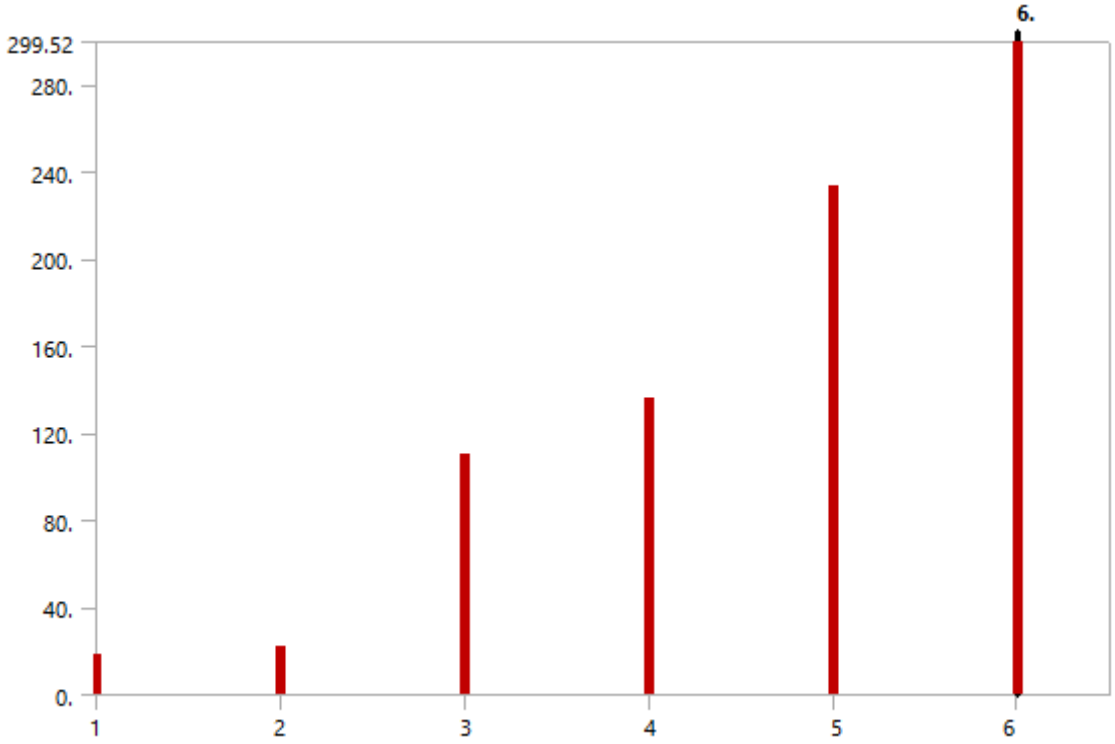


TABLE 14
Model (A4) > Modal (A5) > Solution (A6)

Mode	Frequency [Hz]
1.	17.95
2.	22.384

3.	110.25
4.	136.01
5.	233.19
6.	299.52

TABLE 15
Model (A4) > Modal (A5) > Solution (A6) > Solution Information

Object Name	*Solution Information*
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 16
Model (A4) > Modal (A5) > Solution (A6) > Results

Object Name	*Total Deformation*	*Total Deformation 2*	*Total Deformation 3*	*Total Deformation 4*	*Total Deformation 5*	*Total Deformation 6*
State	Solved					
Scope						
Scoping Method	Geometry Selection					
Geometry	All Bodies					
Definition						
Type	Total Deformation					
Mode	1.	2.	3.	4.	5.	6.
Identifier						
Suppressed	No					
Results						
Minimum	0. m					
Maximum	0.1217 m	0.12161 m	0.12141 m	0.12118 m	0.14929 m	0.12125 m
Average	4.7816e-002 m	4.787e-002 m	5.2944e-002 m	5.318e-002 m	5.5697e-002 m	5.4475e-002 m
Minimum Occurs On	Solid					
Maximum Occurs On	Solid					
Information						
Frequency	17.95 Hz	22.384 Hz	110.25 Hz	136.01 Hz	233.19 Hz	299.52 Hz

TABLE 17
Model (A4) > Modal (A5) > Solution (A6) > Total Deformation

Mode	Frequency [Hz]
1.	17.95
2.	22.384
3.	110.25
4.	136.01
5.	233.19
6.	299.52

TABLE 18
Model (A4) > Modal (A5) > Solution (A6) > Total Deformation 2

Mode	Frequency [Hz]
1.	17.95
2.	22.384
3.	110.25
4.	136.01
5.	233.19
6.	299.52

TABLE 19
Model (A4) > Modal (A5) > Solution (A6) > Total Deformation 3

Mode	Frequency [Hz]
1.	17.95
2.	22.384
3.	110.25
4.	136.01
5.	233.19
6.	299.52

TABLE 20
Model (A4) > Modal (A5) > Solution (A6) > Total Deformation 4

Mode	Frequency [Hz]
1.	17.95
2.	22.384
3.	110.25
4.	136.01
5.	233.19
6.	299.52

TABLE 21
Model (A4) > Modal (A5) > Solution (A6) > Total Deformation 5

Mode	Frequency [Hz]
1.	17.95
2.	22.384
3.	110.25
4.	136.01
5.	233.19
6.	299.52

TABLE 22
Model (A4) > Modal (A5) > Solution (A6) > Total Deformation 6

Mode	Frequency [Hz]
1.	17.95
2.	22.384

3.	110.25
4.	136.01
5.	233.19
6.	299.52

Material Data

magnesium alloy

TABLE 23
magnesium alloy > Constants

Density	1800 kg m^-3

TABLE 24
magnesium alloy > Color

Red	Green	Blue
103	192	205

TABLE 25
magnesium alloy > Isotropic Elasticity

Young's Modulus Pa	Poisson's Ratio	Bulk Modulus Pa	Shear Modulus Pa	Temperature C
4.5e+010	0.29	3.5714e+010	1.7442e+010	