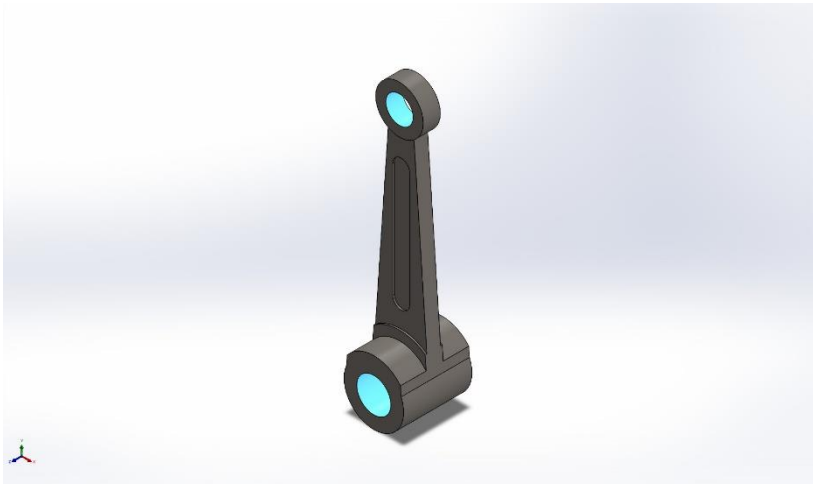


Simulation of connectingRod

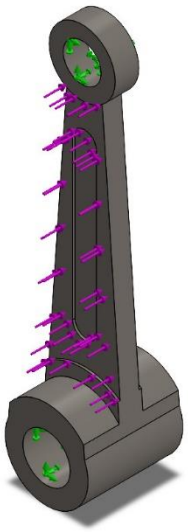
Date: 07 March 2024
Designer: Solidworks
Study name: Bending Force
Analysis type: Static

Table of Contents

Description

Study of Stress and strain distribution along the length of connecting rod subjected to bending forces due to inertia of connecting rod.

Model Information



Model name: connectingRod
Current Configuration: Default

Solid Bodies

Document Name and Reference	Treated As	Volumetric Properties
Scale2 	Solid Body	**Mass:0.000408217 kg** **Volume:5.20021e-08 m^3** **Density:7,850 kg/m^3** **Weight:0.00400052 N**

Study Properties

Study name	Bending Force
Analysis type	Static
Mesh type	Solid Mesh
Thermal Effect:	On
Thermal option	Include temperature loads
Zero strain temperature	298 Kelvin
Include fluid pressure effects from SOLIDWORKS Flow Simulation	Off
Solver type	Automatic
Inplane Effect:	Off
Soft Spring:	Off
Inertial Relief:	Off
Incompatible bonding options	Automatic
Large displacement	On
Compute free body forces	On
Friction	Off
Use Adaptive Method:	Off

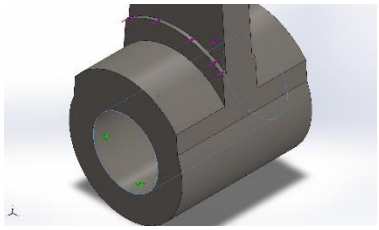
Units

Unit system:	SI (MKS)
Length/Displacement	mm
Temperature	Kelvin
Angular velocity	Rad/sec
Pressure/Stress	N/m^2

Material Properties

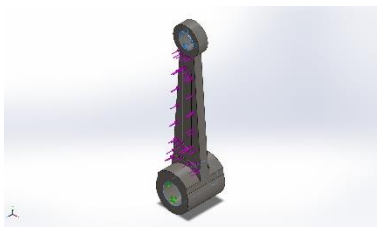
Model Reference	Properties		Components
	**Name:**	AISI 4340 Steel, annealed	SolidBody 1(Scale2)(connectingRod)
	Model type:	Linear Elastic Isotropic	
	Default failure criterion:	Max von Mises Stress	
	Yield strength:	4.7e+08 N/m^2	
	Tensile strength:	7.45e+08 N/m^2	
	Elastic modulus:	2.05e+11 N/m^2	
	Poisson's ratio:	0.285	
	Mass density:	7,850 kg/m^3	
	Shear modulus:	8e+10 N/m^2	
	Thermal expansion coefficient:	1.23e-05 /Kelvin	
Curve Data:N/A			

Loads and Fixtures

Fixture name	Fixture Image	Fixture Details
Fixed-1		**Entities:** 1 face(s) **Type:** Fixed Geometry

Resultant Forces

Components	X	Y	Z	Resultant
Reaction force(N)	-0.00971395	-46.6343	304.186	307.74
Reaction Moment(N.m)	0	0	0	0

Fixed-2		**Entities:** 2 face(s) **Type:** Fixed Geometry

Resultant Forces

Components	X	Y	Z	Resultant
Reaction force(N)	-0.00161389	-0.00167151	500	500
Reaction Moment(N.m)	0	0	0	0

Load name	Load Image	Load Details
Force-1		**Entities:** 1 face(s) **Type:** Apply normal force **Value:** 500 N

Mesh information

Mesh type	Solid Mesh
Mesher Used:	Blended curvature-based mesh
Jacobian points for High quality mesh	16 Points
Maximum element size	0.522851 mm
Minimum element size	0.373465 mm
Mesh Quality	High

Mesh information - Details

Total Nodes	6737
Total Elements	3802
Maximum Aspect Ratio	6.5136
% of elements with Aspect Ratio < 3	90.8
Percentage of elements with Aspect Ratio > 10	0
Percentage of distorted elements	0
Time to complete mesh(hh;mm;ss):	00:00:02
Computer name:	Amol Kamal

Resultant Forces

Reaction forces

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	-0.00161389	-0.00167151	500	500

Reaction Moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

Free body forces

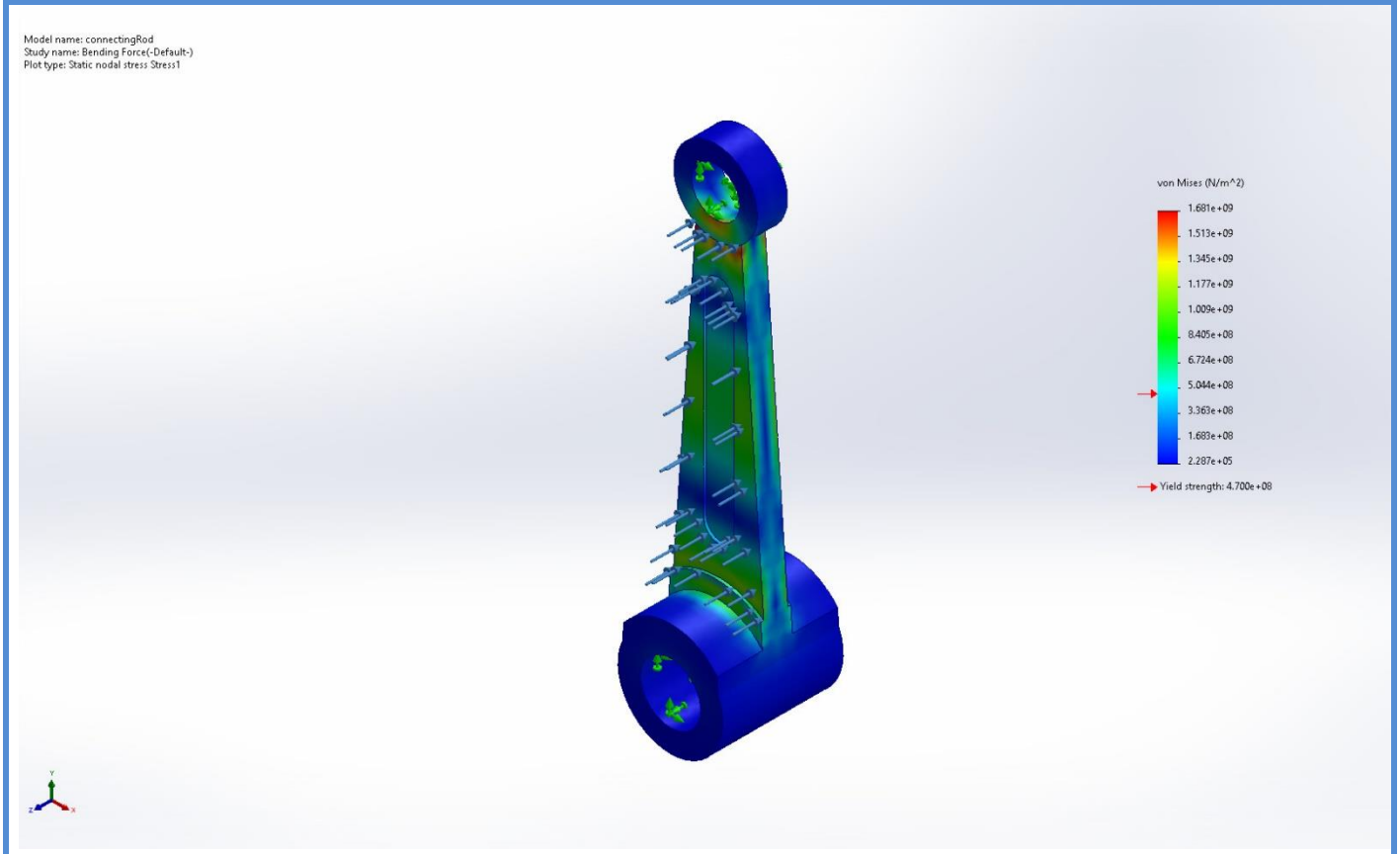
Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N	0	0	0	0

Free body moments

Selection set	Units	Sum X	Sum Y	Sum Z	Resultant
Entire Model	N.m	0	0	0	0

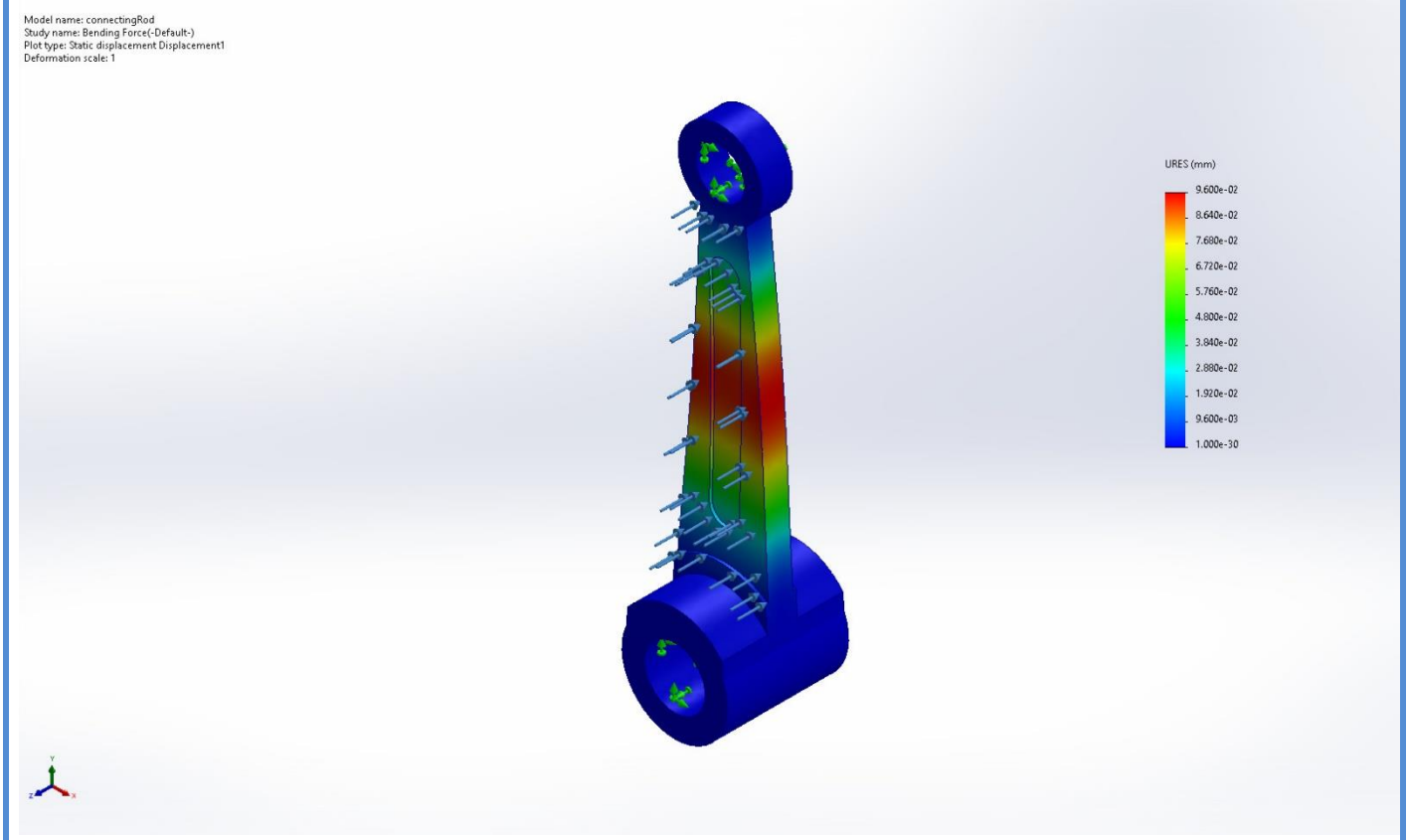
Study Results

Name	Type	Min	Max
Stress1	VON: von Mises Stress	2.287e+05N/m^2 Node: 4875	1.681e+09N/m^2 Node: 6718



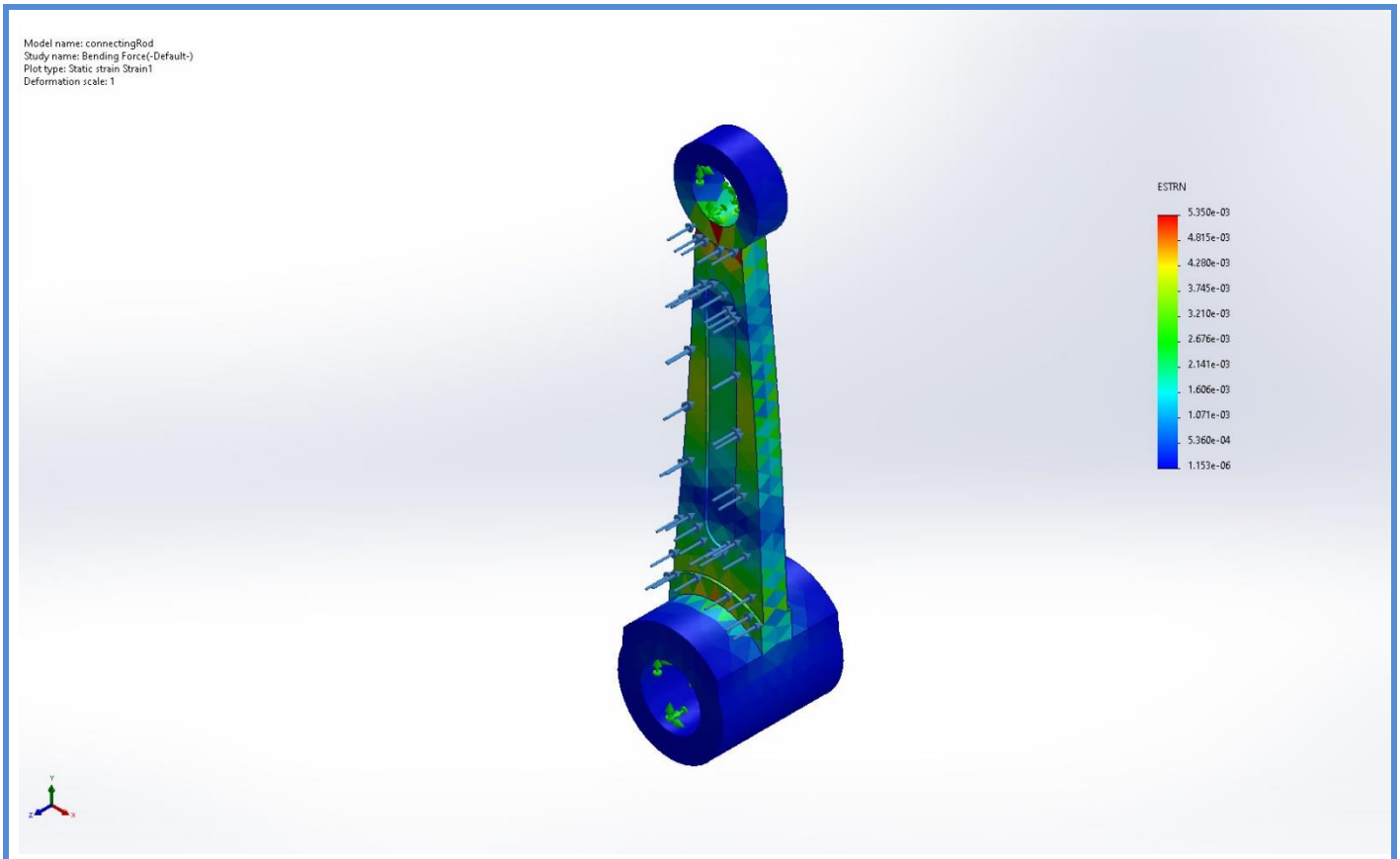
connectingRod-Bending Force-Stress-Stress1

Name	Type	Min	Max
Displacement1	URES: Resultant Displacement	0.000e+00mm Node: 33	9.600e-02mm Node: 4837



connectingRod-Bending Force-Displacement-Displacement1

Name	Type	Min	Max
Strain1	ESTRN: Equivalent Strain	1.153e-06 Element: 2520	5.350e-03 Element: 2484



connectingRod-Bending Force-Strain-Strain1