

Frame Analysis Report



Analyzed File:	Treliça_José_1.iam
Version:	2017.2 (Build 212233000, 233)
Creation Date:	07/12/2016, 22:14
Simulation Author:	Walter A. Kapp
Summary:	

Project Info (iProperties)

Summary

Title	Auto financiado
Subject	Robo EngeMOVI serial de 7 juntas
Author	Walter A. Kapp
Manager	Walter A. Kapp
Company	EngeMOVI

Project

Part Number	Treliça_José_1
Project	RES
Designer	Walter A. Kapp
Engineer	Walter A. Kapp
Cost	R\$ 0,00
Date Created	01/11/2016

Status

Design Status	WorkInProgress
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Custom

Cliente	EngeMOVI
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Physical

Mass	334,604 kg
Area	102095,817 mm ²
Volume	42570,490 mm ³
Center of Gravity	x=112,199 mm y=0,839 mm z=-0,000 mm

Simulation:1

General objective and settings:

Simulation Type	Static Analysis
Last Modification Date	07/12/2016, 22:09

Material(s)

Name	Steel, Mild	
General	Mass Density	7,860 g/cm ³
	Yield Strength	207,000 MPa
	Ultimate Tensile Strength	345,000 MPa
Stress	Young's Modulus	220,000 GPa
	Poisson's Ratio	0,275 ul
Part Name(s)	ISO 120x 15 00000046.ipt ISO 120x 30 00000048.ipt ISO 100x100x6 00000038.ipt ISO 100x100x6 00000005.ipt ISO 100x100x6 00000006.ipt ISO 120x 12 00000043.ipt ISO 120x 15 00000044.ipt ISO 120x 15 00000045.ipt ISO 120x 25 00000050.ipt	

Cross Section(s)

Geometry Properties	Section Area (A)	1800,000 mm ²
	Section Width	15,000 mm
	Section Height	120,000 mm
	Section Centroid (x)	7,500 mm
	Section Centroid (y)	60,000 mm
Mechanical Properties	Moment of Inertia (I _x)	2160000,000 mm ⁴
	Moment of Inertia (I _y)	33750,000 mm ⁴
	Torsional Rigidity Modulus (J)	124325,239 mm ⁴
	Section Modulus (W _x)	36000,000 mm ³
	Section Modulus (W _y)	4500,000 mm ³
	Torsional Section Modulus (W _z)	8288,398 mm ³
	Reduced Shear Area (A _x)	1200,000 mm ²
Reduced Shear Area (A _y)	1200,000 mm ²	
Part Name(s)	ISO 120x 15 00000046.ipt ISO 120x 15 00000044.ipt ISO 120x 15 00000045.ipt	

Geometry Properties	Section Area (A)	3600,000 mm ²
	Section Width	30,000 mm
	Section Height	120,000 mm
	Section Centroid (x)	15,000 mm
	Section Centroid (y)	60,000 mm
Mechanical Properties	Moment of Inertia (I _x)	4320000,000 mm ⁴
	Moment of Inertia (I _y)	270000,000 mm ⁴
	Torsional Rigidity Modulus (J)	909636,007 mm ⁴
	Section Modulus (W _x)	72000,000 mm ³
	Section Modulus (W _y)	18000,000 mm ³
	Torsional Section Modulus (W _z)	30414,403 mm ³
	Reduced Shear Area (A _x)	2400,000 mm ²
Reduced Shear Area (A _y)	2400,000 mm ²	
Part Name(s)	ISO 120x 30 00000048.ipt	

Geometry Properties	Section Area (A)	2163,292 mm ²
	Section Width	100,000 mm
	Section Height	100,000 mm
	Section Centroid (x)	50,000 mm
	Section Centroid (y)	50,000 mm
Mechanical Properties	Moment of Inertia (I _x)	3114741,798 mm ⁴
	Moment of Inertia (I _y)	3114741,798 mm ⁴
	Torsional Rigidity Modulus (J)	4900290,954 mm ⁴
	Section Modulus (W _x)	62294,836 mm ³
	Section Modulus (W _y)	62294,836 mm ³
	Torsional Section Modulus (W _z)	20000,000 mm ³
	Reduced Shear Area (A _x)	995,376 mm ²
Reduced Shear Area (A _y)	995,376 mm ²	
Part Name(s)	ISO 100x100x6 00000038.ipt	

Geometry Properties	Section Area (A)	2163,292 mm ²
	Section Width	100,000 mm
	Section Height	100,000 mm
	Section Centroid (x)	50,000 mm
	Section Centroid (y)	50,000 mm
Mechanical Properties	Moment of Inertia (I _x)	3114741,798 mm ⁴
	Moment of Inertia (I _y)	3114741,798 mm ⁴
	Torsional Rigidity Modulus (J)	4900290,954 mm ⁴
	Section Modulus (W _x)	62294,836 mm ³
	Section Modulus (W _y)	62294,836 mm ³
	Torsional Section Modulus (W _z)	0,000 mm ³
	Reduced Shear Area (A _x)	995,376 mm ²
Reduced Shear Area (A _y)	995,376 mm ²	
Part Name(s)	ISO 100x100x6 00000005.ipt ISO 100x100x6 00000006.ipt	

Geometry Properties	Section Area (A)	1440,000 mm ²
	Section Width	12,000 mm
	Section Height	120,000 mm
	Section Centroid (x)	6,000 mm
	Section Centroid (y)	60,000 mm
Mechanical Properties	Moment of Inertia (I _x)	1728000,000 mm ⁴
	Moment of Inertia (I _y)	17280,000 mm ⁴
	Torsional Rigidity Modulus (J)	64744,007 mm ⁴
	Section Modulus (W _x)	28800,000 mm ³
	Section Modulus (W _y)	2880,000 mm ³
	Torsional Section Modulus (W _z)	5395,335 mm ³
	Reduced Shear Area (A _x)	960,000 mm ²
Reduced Shear Area (A _y)	960,000 mm ²	
Part Name(s)	ISO 120x 12 00000043.ipt	

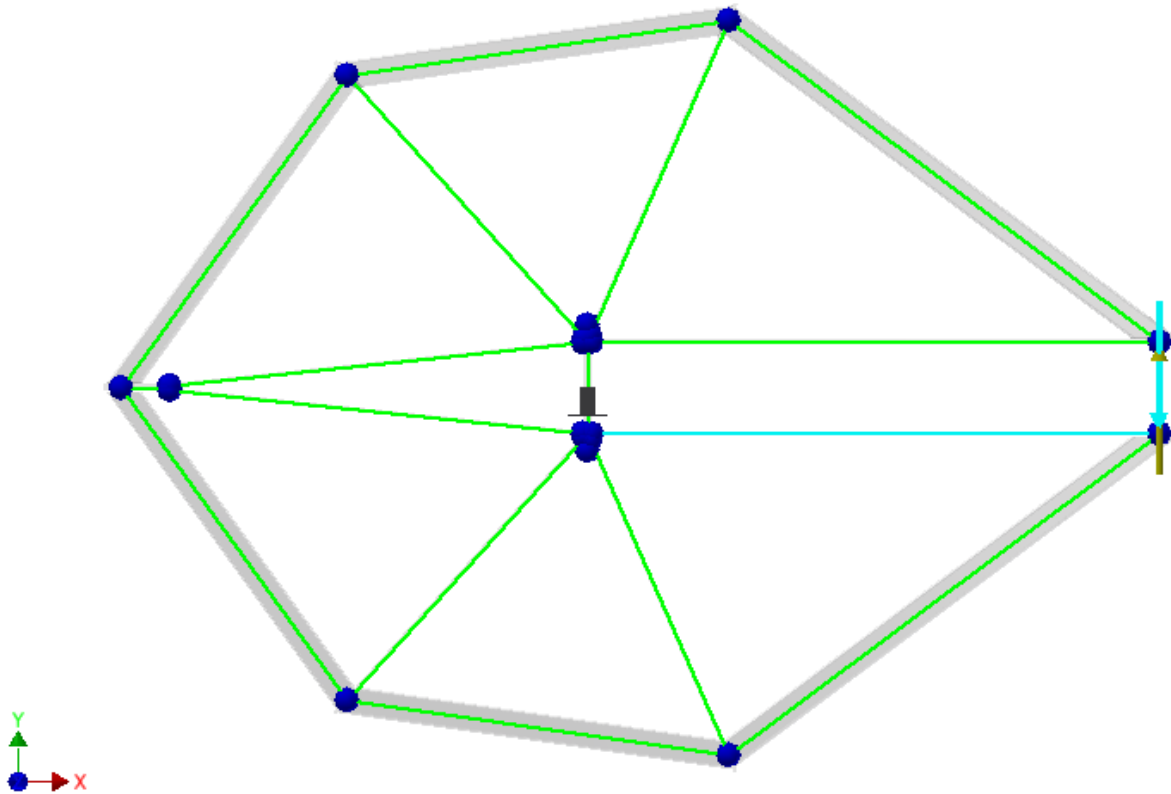
Geometry Properties	Section Area (A)	3000,000 mm ²
	Section Width	25,000 mm
	Section Height	120,000 mm
	Section Centroid (x)	12,500 mm
	Section Centroid (y)	60,000 mm
Mechanical Properties	Moment of Inertia (I _x)	3600000,000 mm ⁴
	Moment of Inertia (I _y)	156250,000 mm ⁴
	Torsional Rigidity Modulus (J)	542810,405 mm ⁴
	Section Modulus (W _x)	60000,000 mm ³
	Section Modulus (W _y)	12500,000 mm ³
	Torsional Section Modulus (W _z)	21731,440 mm ³
	Reduced Shear Area (A _x)	2000,000 mm ²
Reduced Shear Area (A _y)	2000,000 mm ²	
Part Name(s)	ISO 120x 25 00000050.ipt	

☐ Operating conditions

☐ Force:1

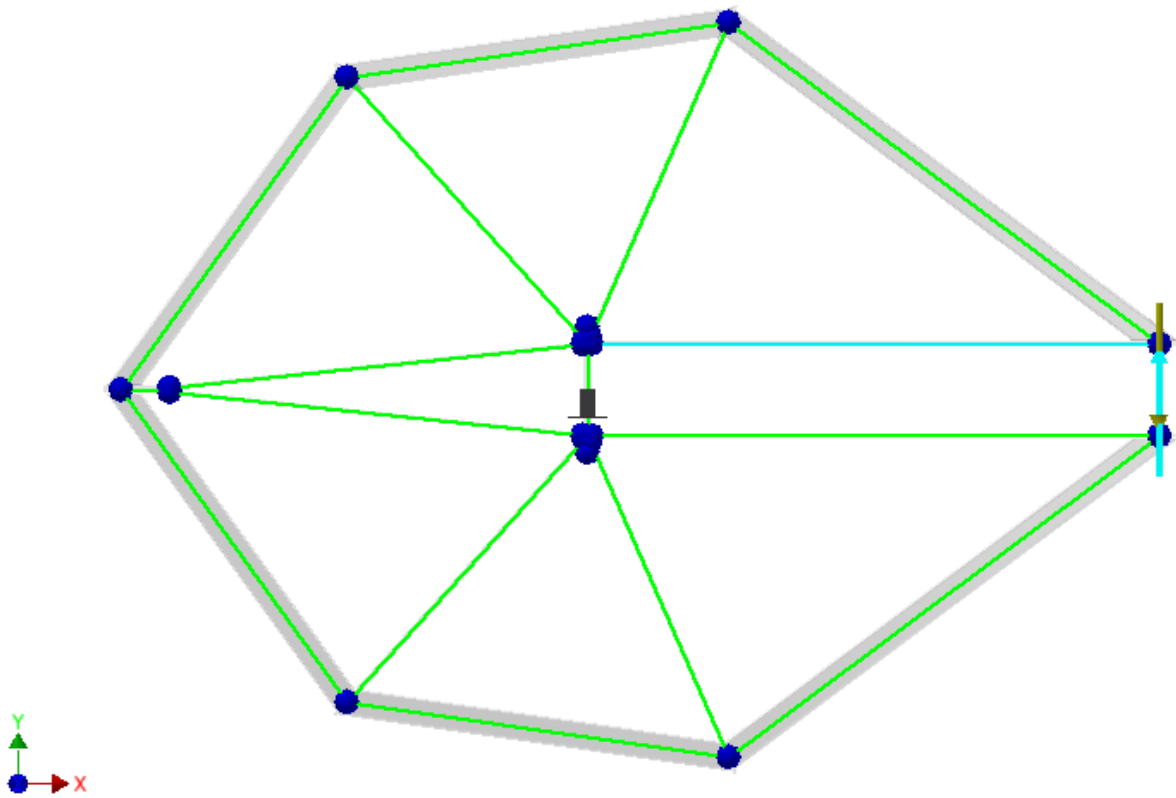
Load Type	Force
Magnitude	30000,000 N
Beam Coordinate System	No
Angle of Plane	270,00 deg
Angle in Plane	90,00 deg
F _x	0,000 N
F _y	-30000,000 N
F _z	0,000 N
Offset	0,000 mm

☐ Selected Reference(s)

**Force:2**

Load Type	Force
Magnitude	30000,000 N
Beam Coordinate System	No
Angle of Plane	90,00 deg
Angle in Plane	90,00 deg
Fx	0,000 N
Fy	30000,000 N
Fz	0,000 N
Offset	0,000 mm

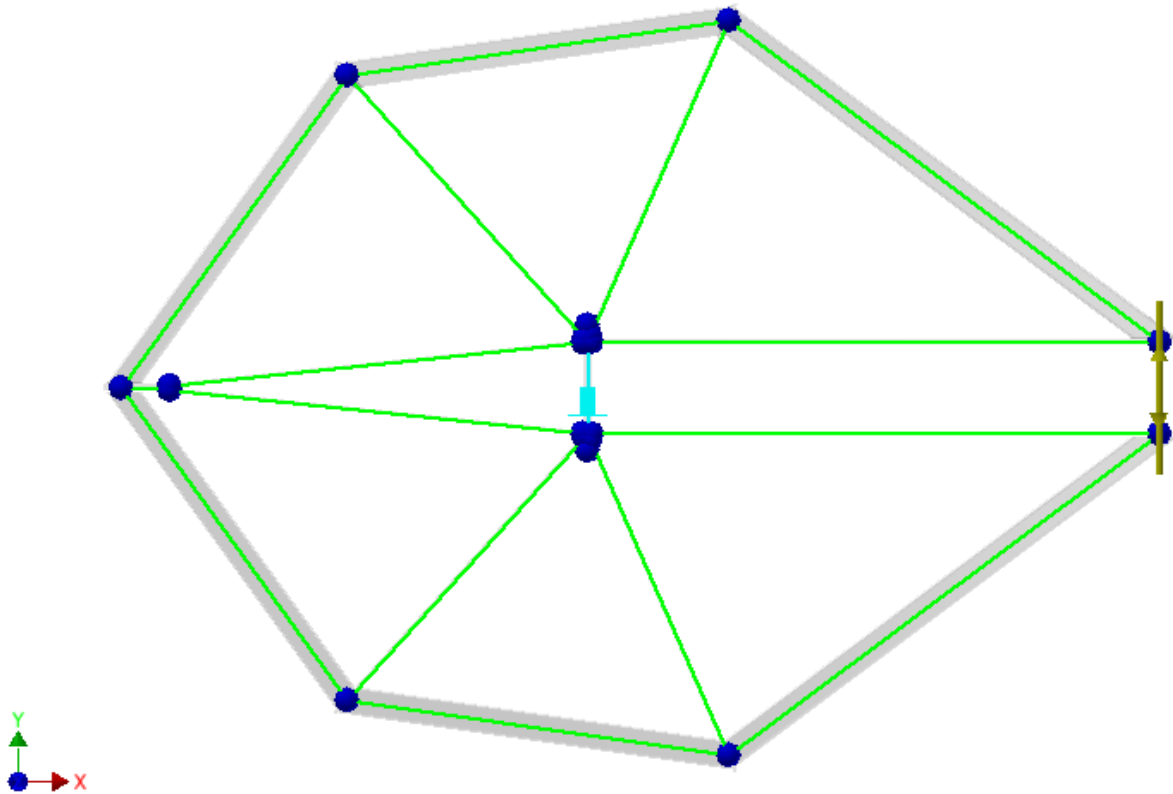
Selected Reference(s)



Fixed Constraint:1

Constraint Type	Fixed
Offset	0,50000 ul

Selected Reference(s)



Results

Reaction Force and Moment on Constraints

Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Components (Fx,Fy,Fz)	Magnitude	Components (Mx,My,Mz)
Fixed Constraint:1	0,000 N	0,000 N	0,000 N mm	-0,000 N mm
		-0,000 N		0,000 N mm
		-0,000 N		-0,000 N mm

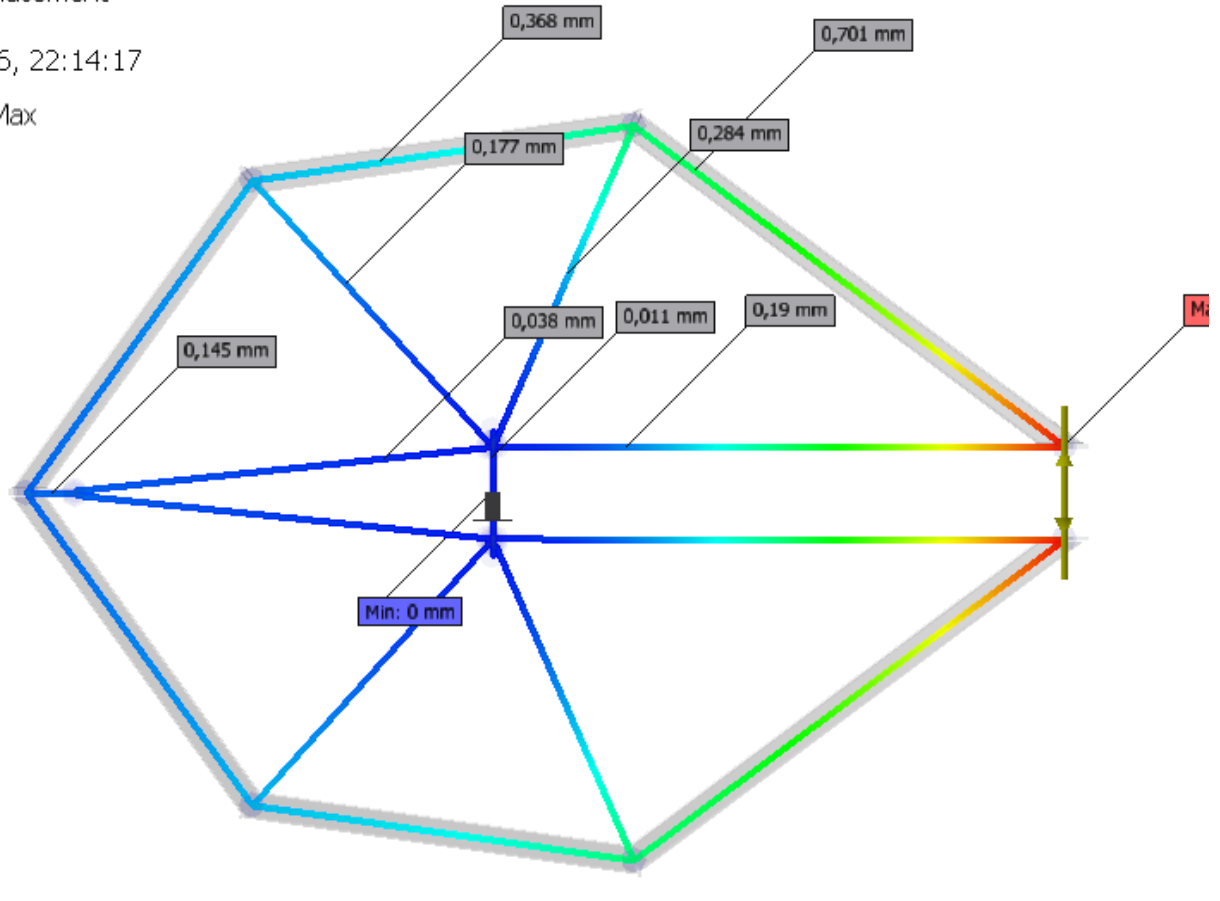
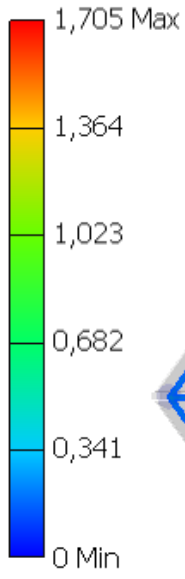
Static Result Summary

Name		Minimum	Maximum
Displacement		0,000 mm	1,705 mm
Forces	Fx	-11516,704 N	11516,704 N
	Fy	-117,832 N	119,152 N
	Fz	-69597,962 N	57389,644 N
Moments	Mx	-0,000 N mm	236057,240 N mm
	My	-26162,487 N mm	162577,731 N mm
	Mz	-0,000 N mm	0,000 N mm
Normal Stresses	Smax	-23,940 MPa	28,365 MPa
	Smin	-30,318 MPa	23,462 MPa
	Smax(Mx)	-0,000 MPa	3,789 MPa
	Smin(Mx)	-3,789 MPa	0,000 MPa
	Smax(My)	-0,000 MPa	9,032 MPa
	Smin(My)	-9,032 MPa	0,000 MPa
	Saxial	-26,529 MPa	23,476 MPa
Shear Stresses	Tx	-4,799 MPa	4,799 MPa
	Ty	-0,120 MPa	0,118 MPa
Torsional Stresses	T	-0,000 MPa	0,000 MPa

Figures

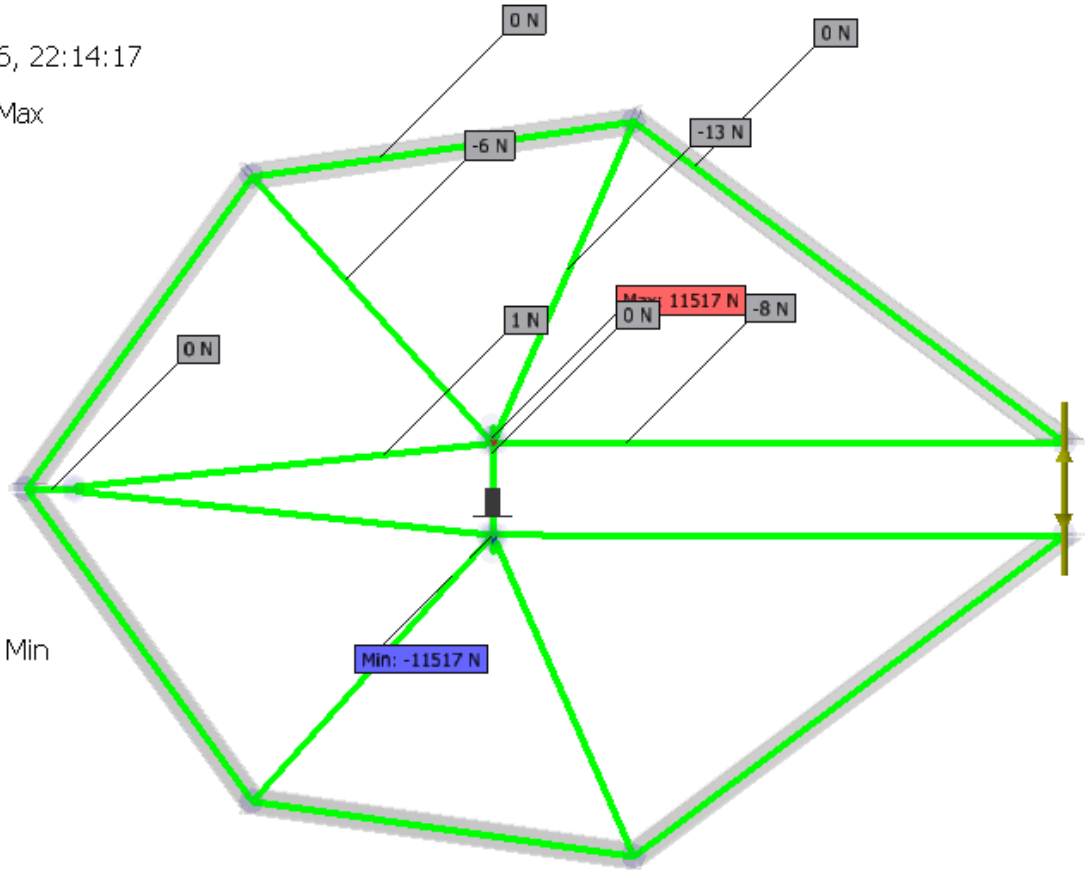
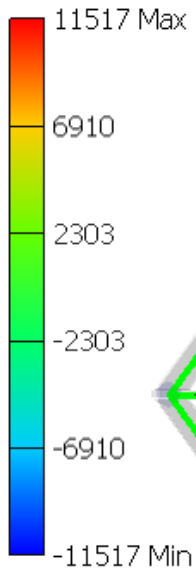
Displacement

Type: Displacement
Units: mm
07/12/2016, 22:14:17



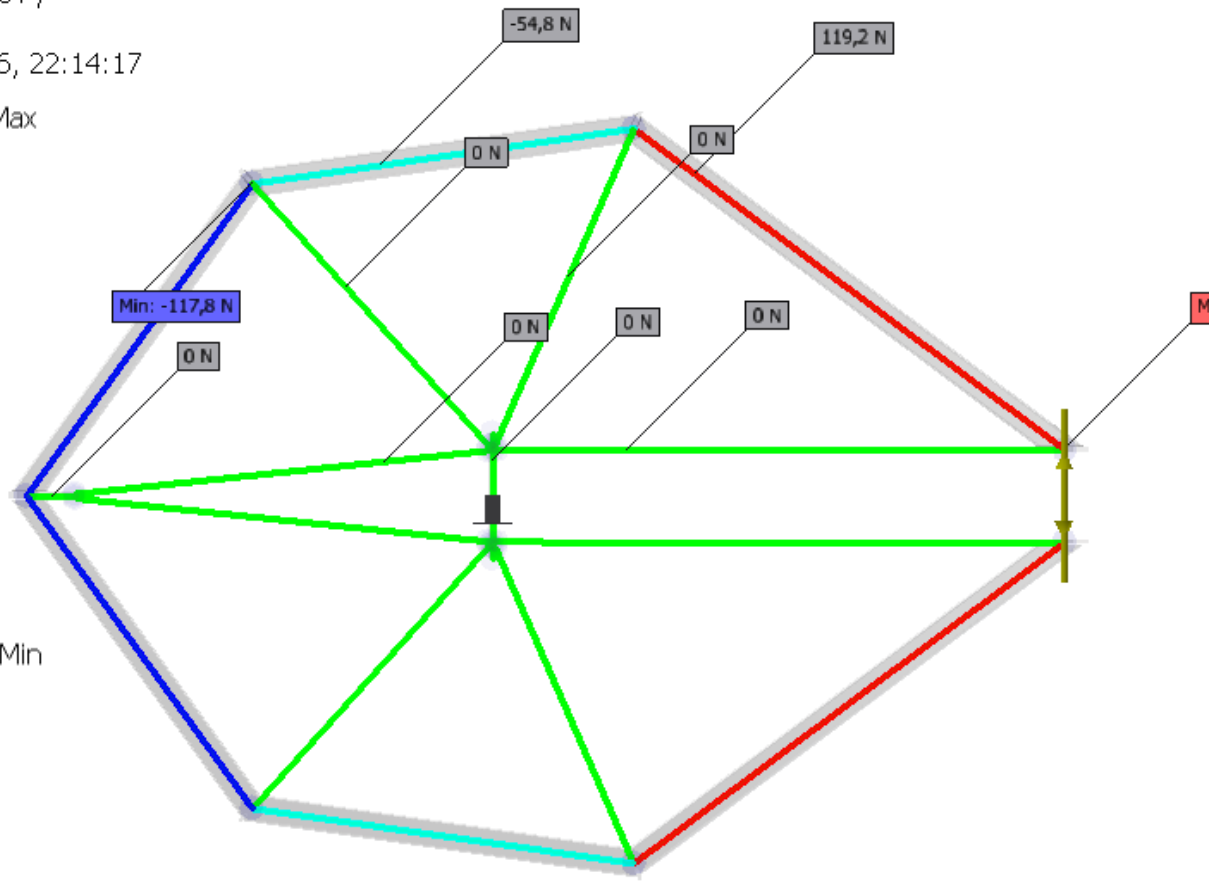
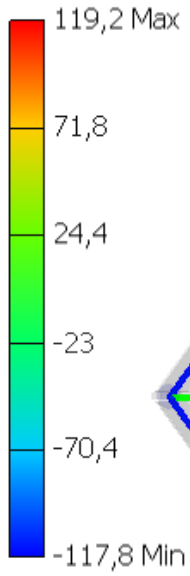
☐ Fx

Type: Force Fx
Units: N
07/12/2016, 22:14:17



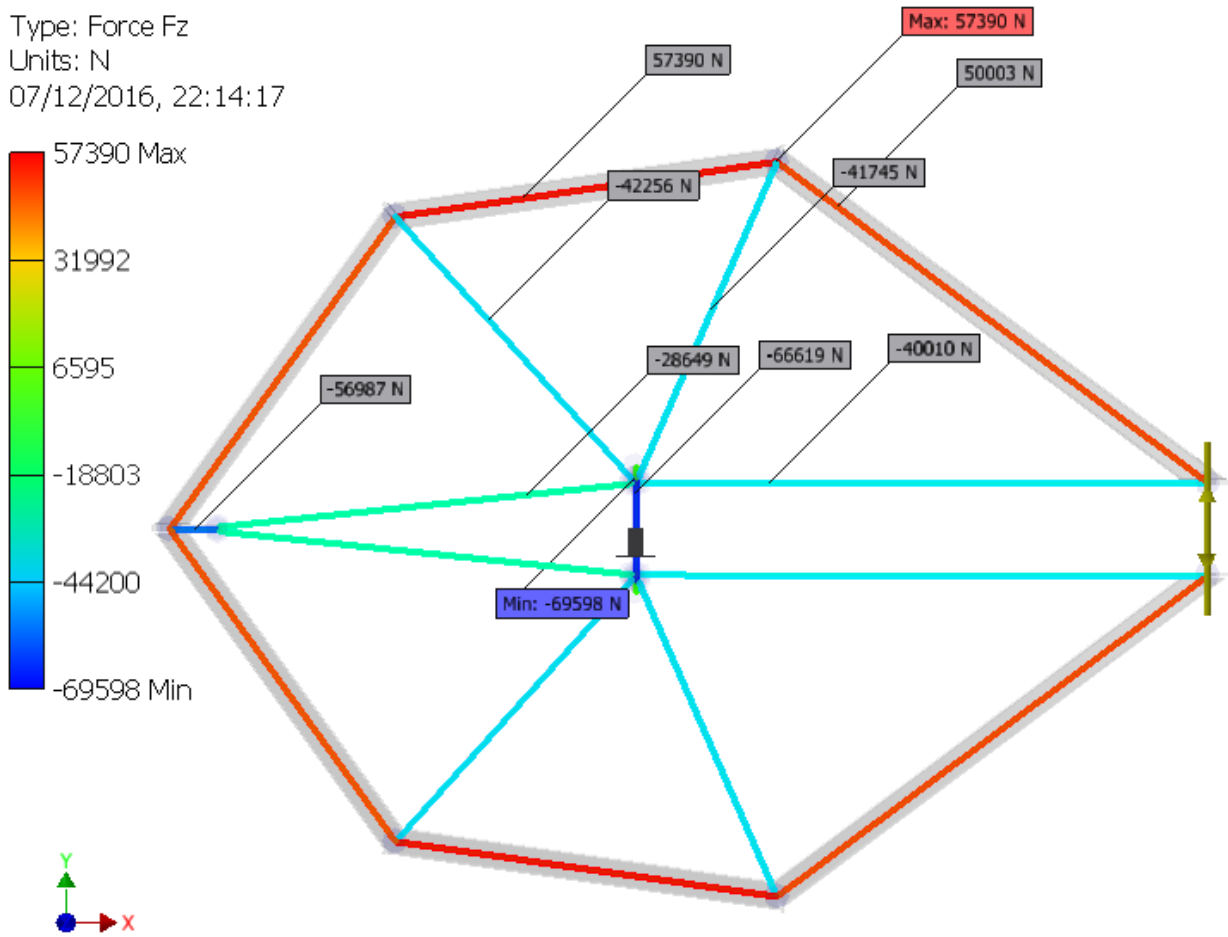
Fy

Type: Force Fy
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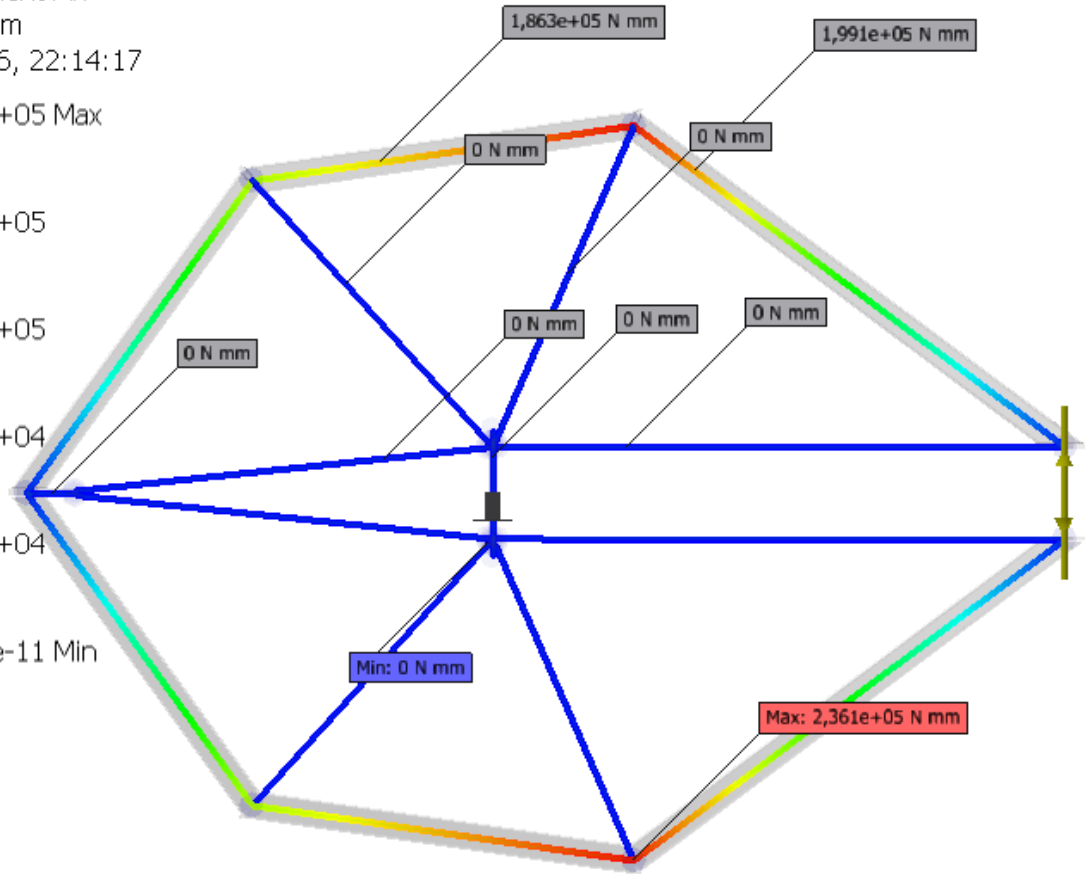
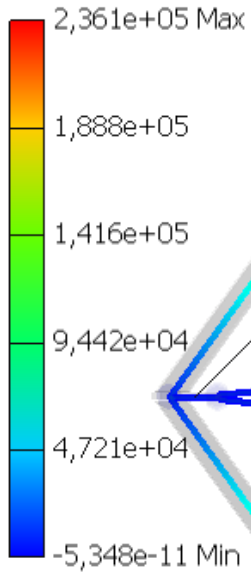
☐ Fz

Type: Force Fz
Units: N
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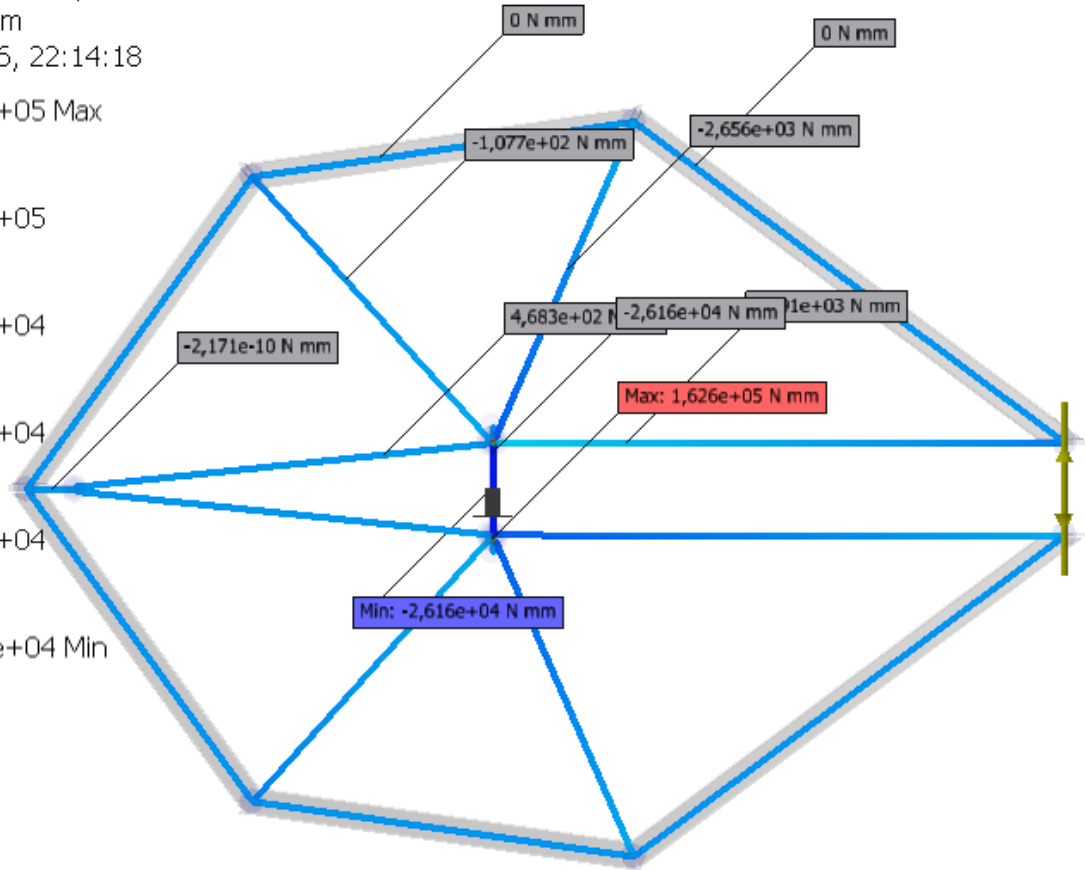
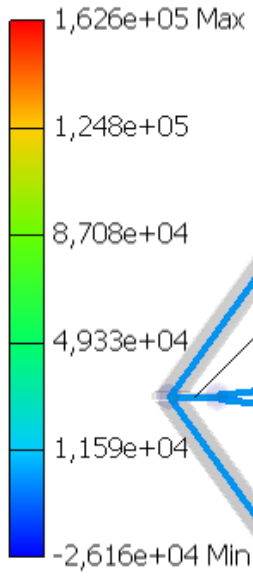
☐ Mx

Type: Moment Mx
Units: N mm
07/12/2016, 22:14:17



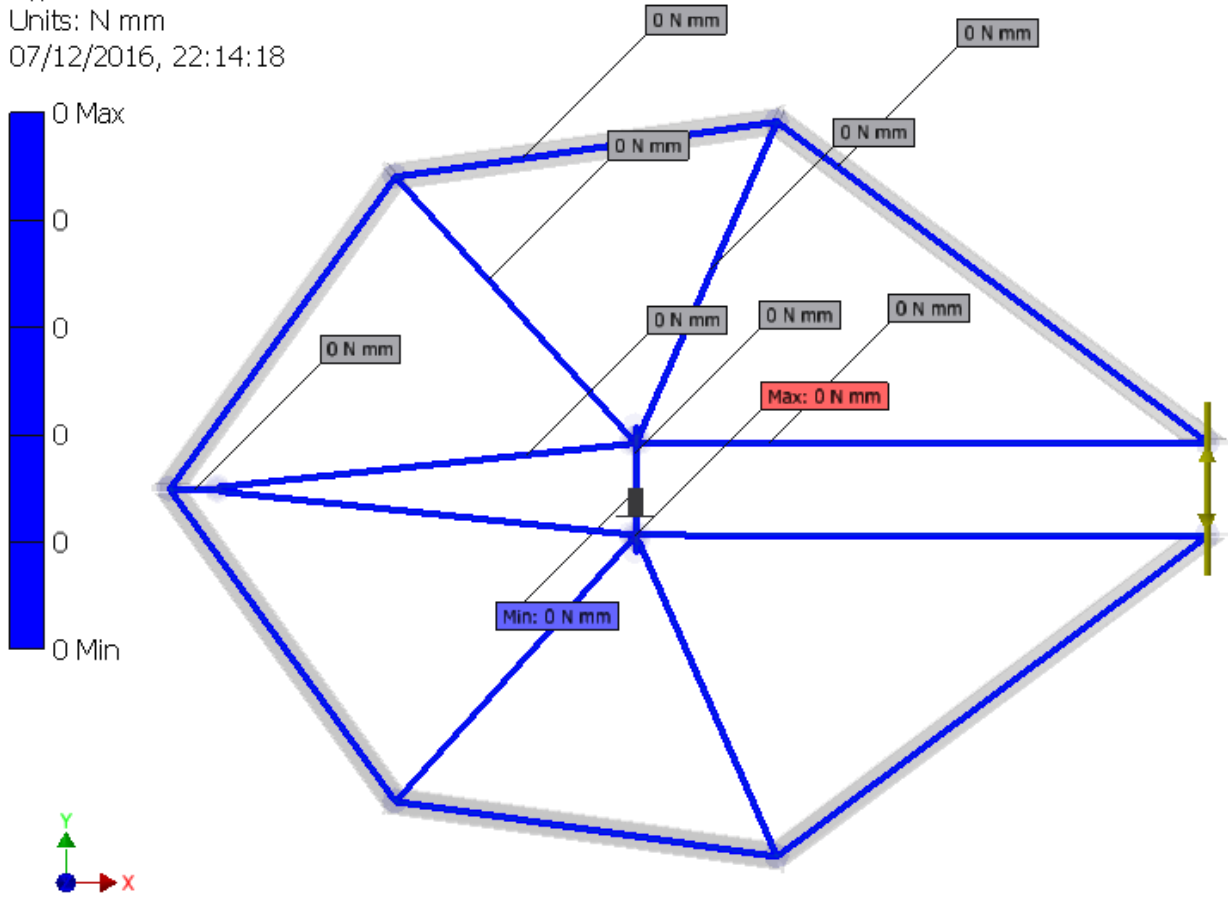
My

Type: Moment My
Units: N mm
07/12/2016, 22:14:18



☐ Mz

Type: Moment Mz
Units: N mm
07/12/2016, 22:14:18

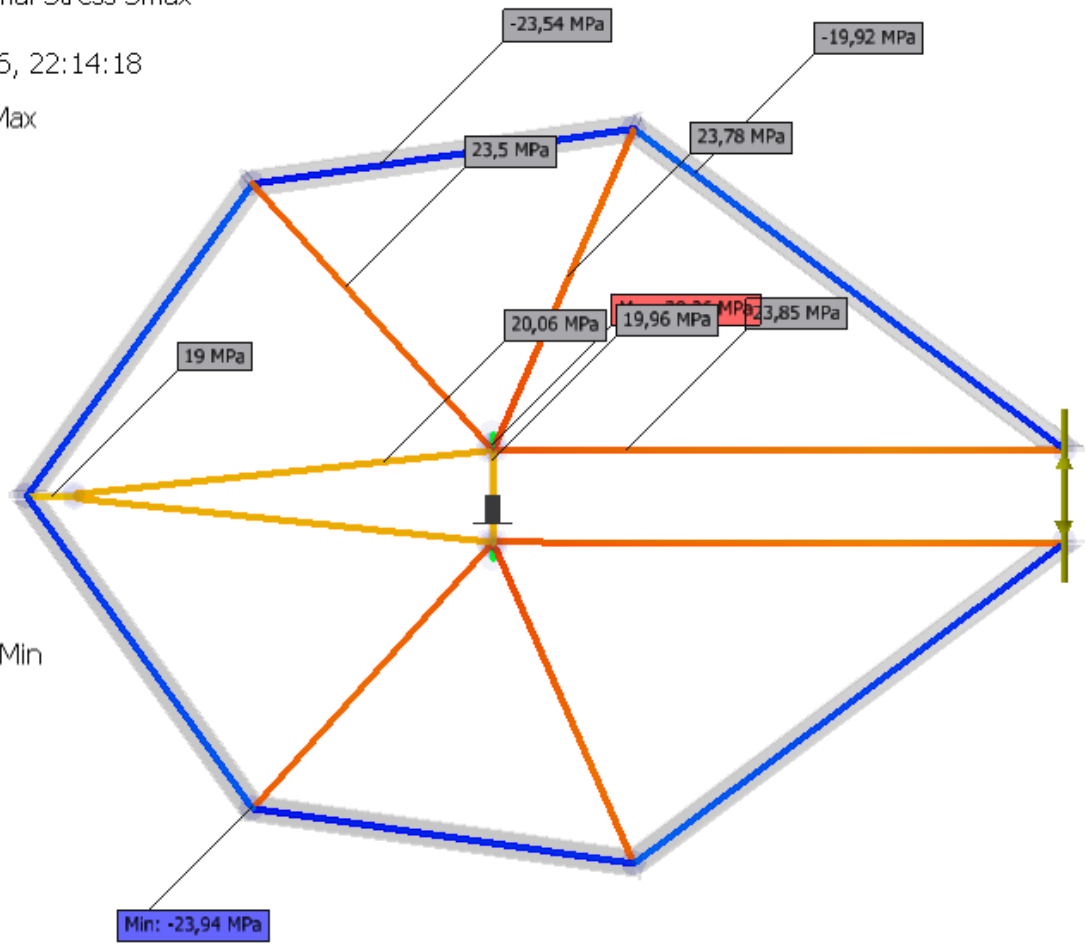
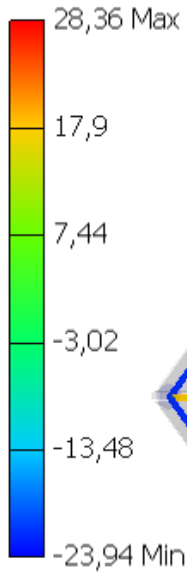


☐ Smax

Type: Normal Stress Smax

Units: MPa

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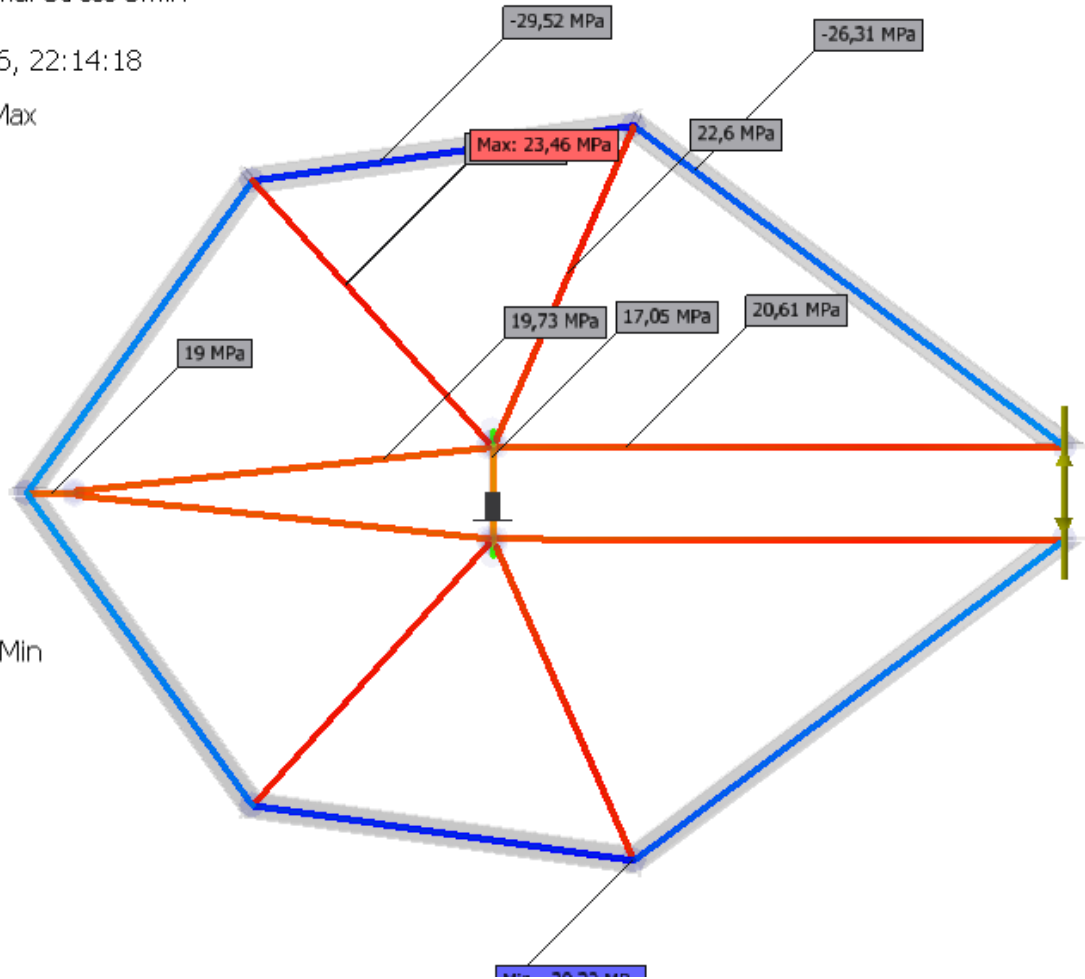
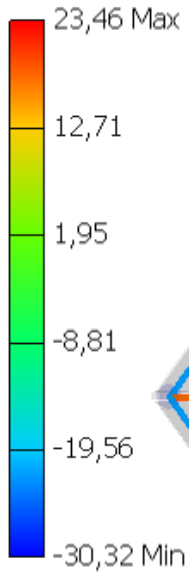


☐ Smin

Type: Normal Stress Smin

Units: MPa

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☐ Smax(Mx)

Type: Bending Stress (Mx) max

Units: MPa

07/12/2016, 22:14:19

3,789 Max

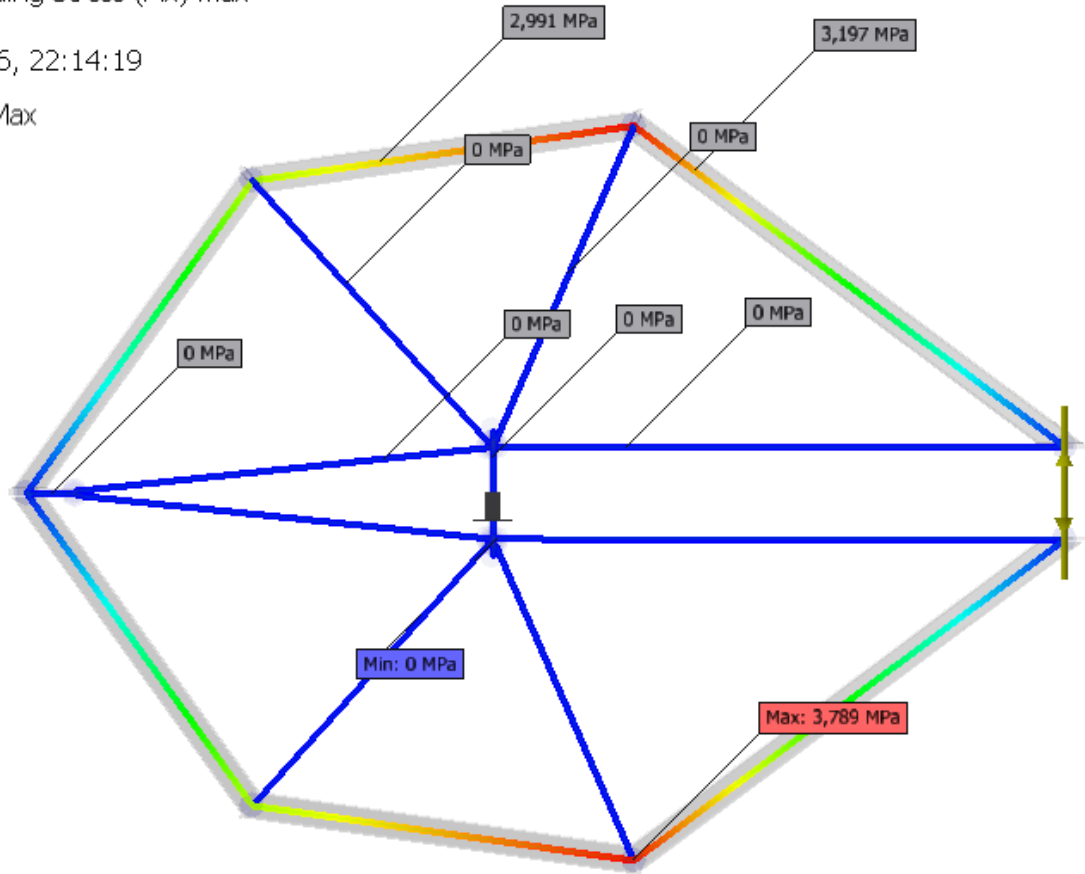
3,031

2,274

1,516

0,758

0 Min

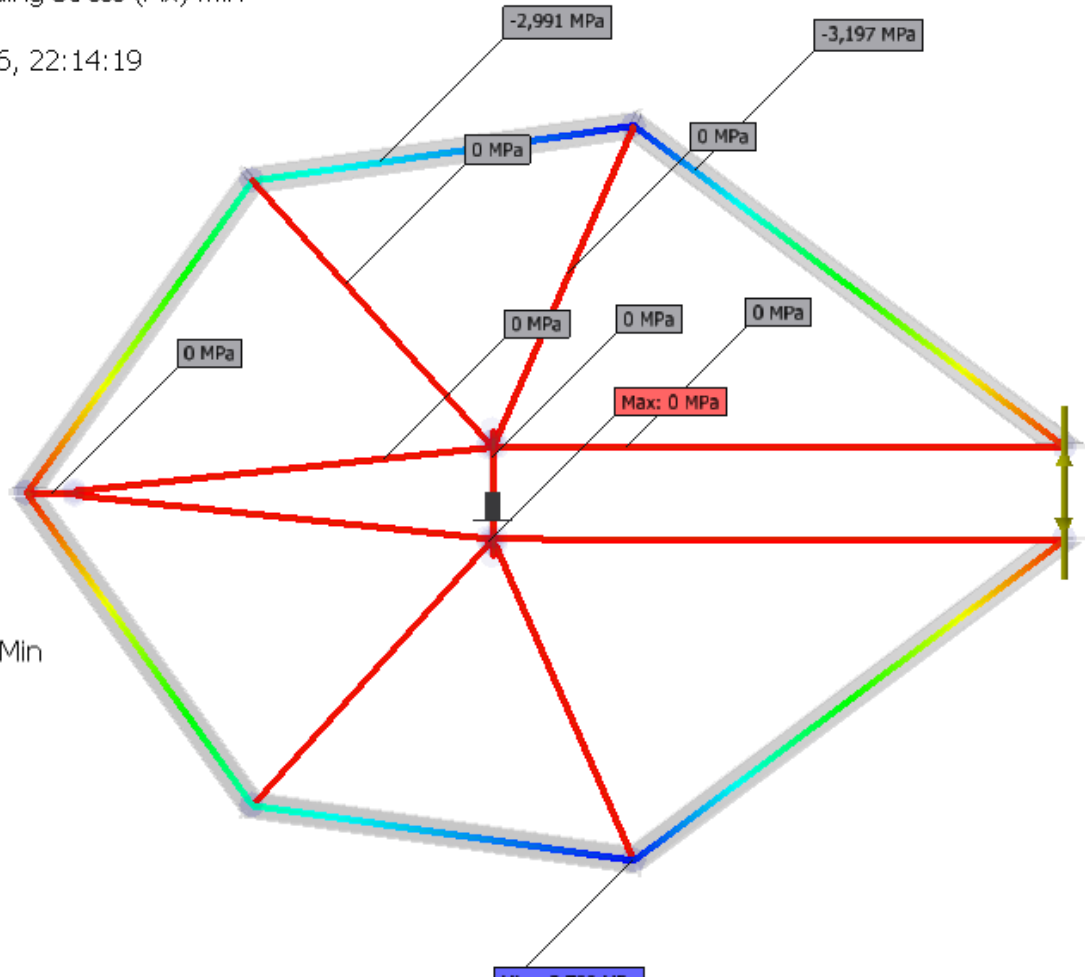
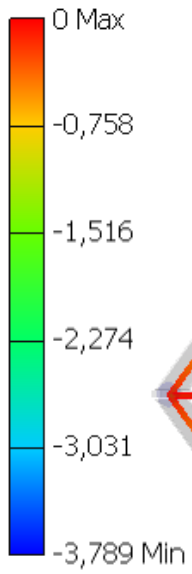


☐ Smin(Mx)

Type: Bending Stress (Mx) min

Units: MPa

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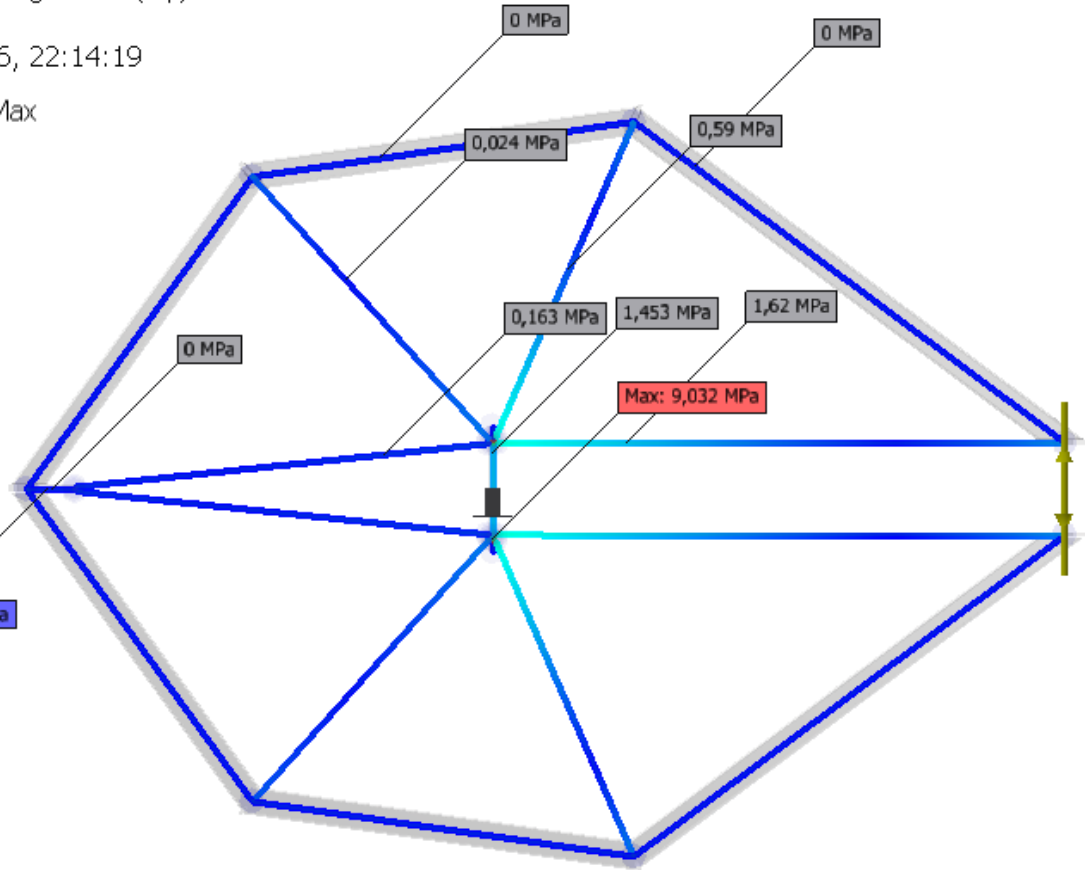
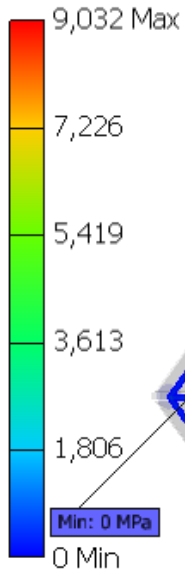


Smax(My)

Type: Bending Stress (My) max

Units: MPa

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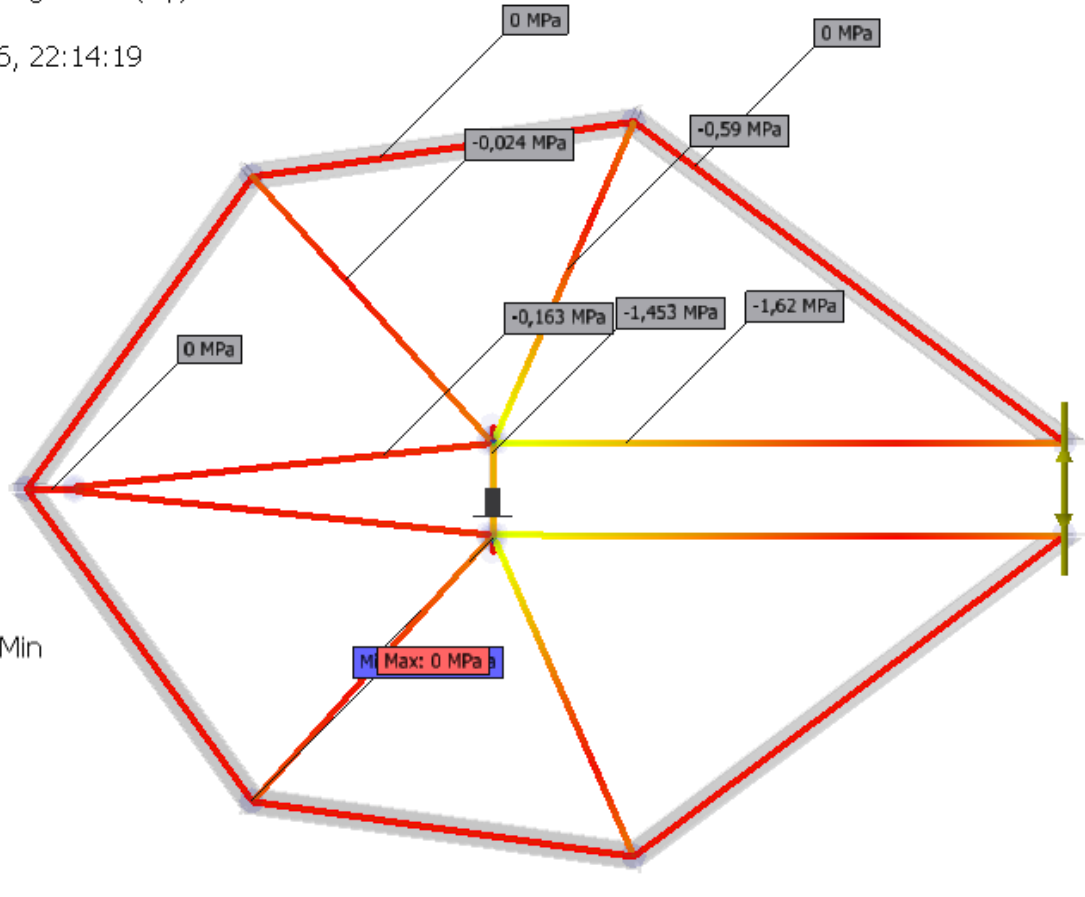
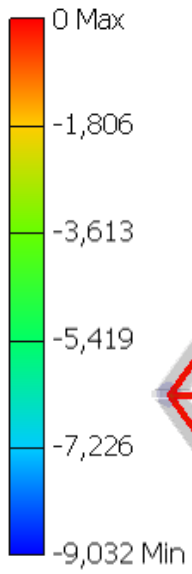


☐ Smin(My)

Type: Bending Stress (My) min

Units: MPa

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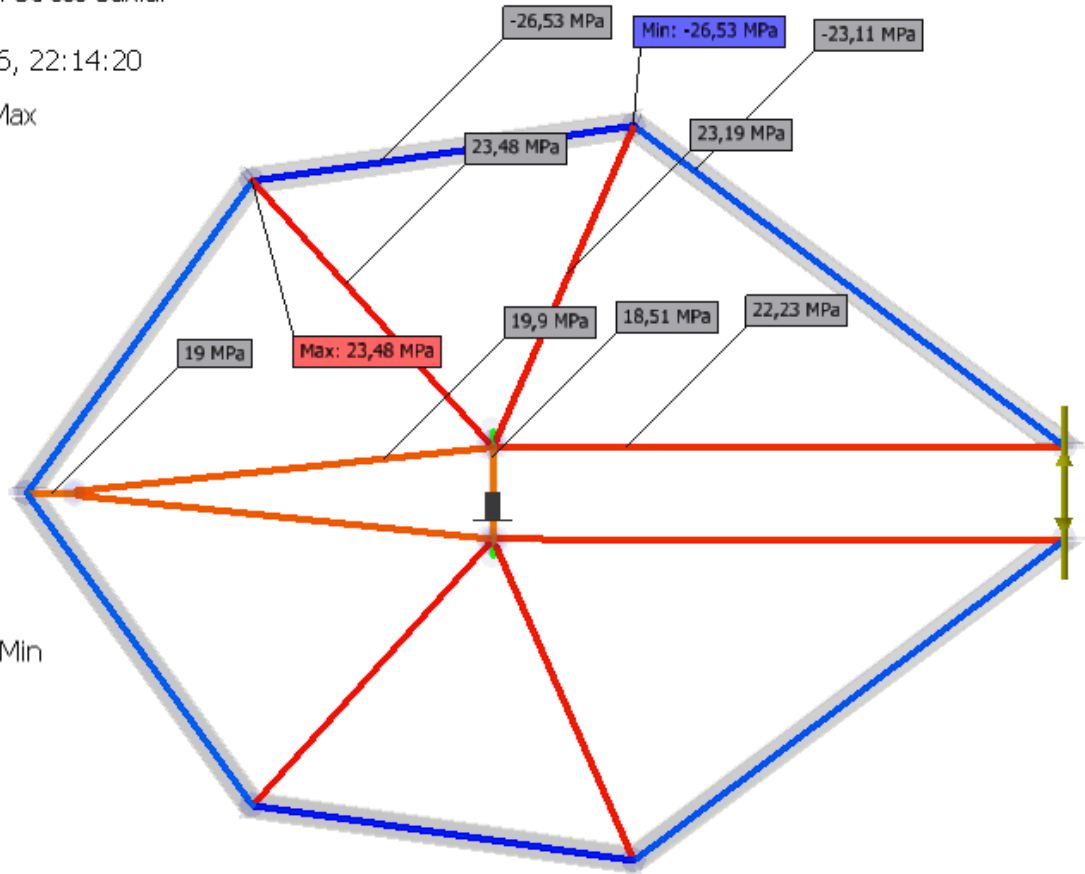
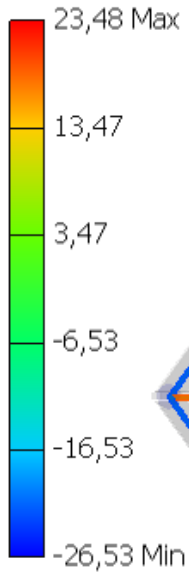


☐ **Saxial**

Type: Axial Stress Saxial

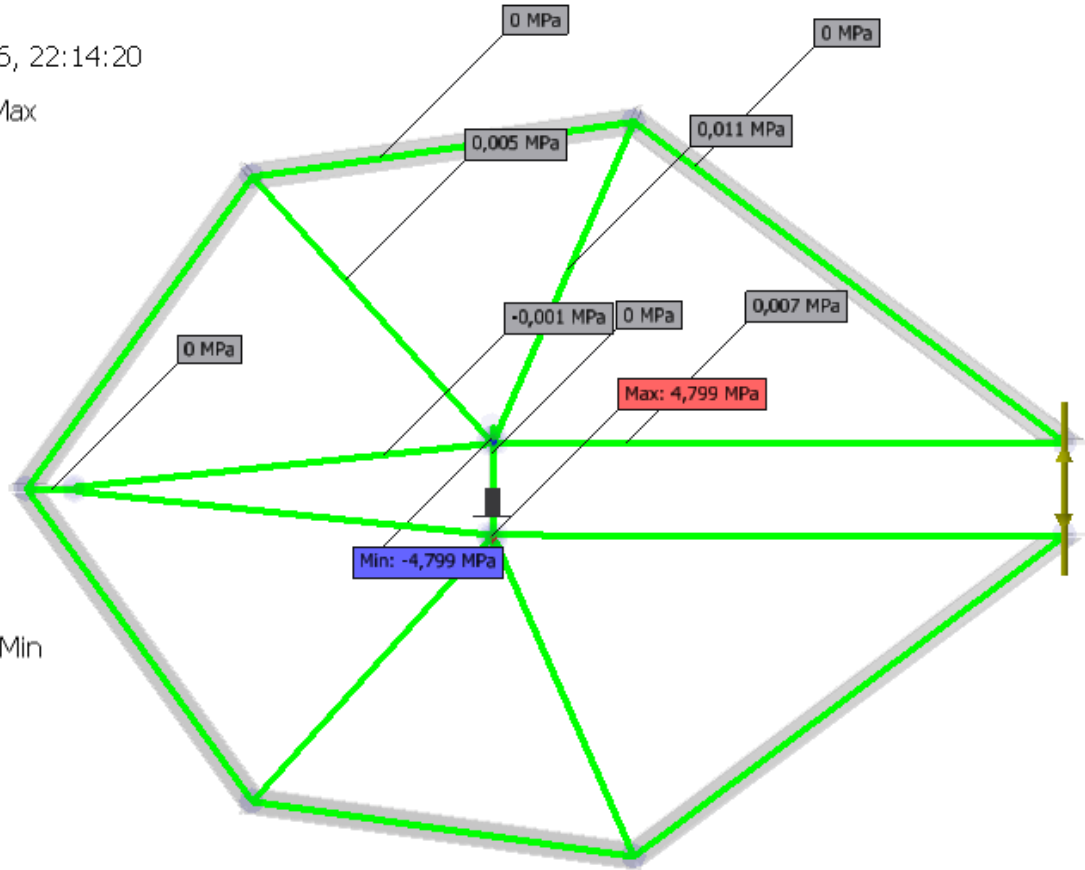
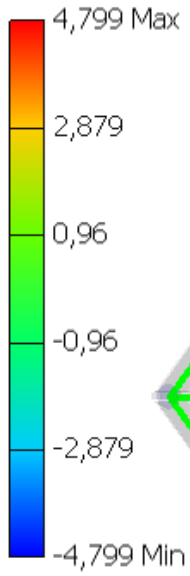
Units: MPa

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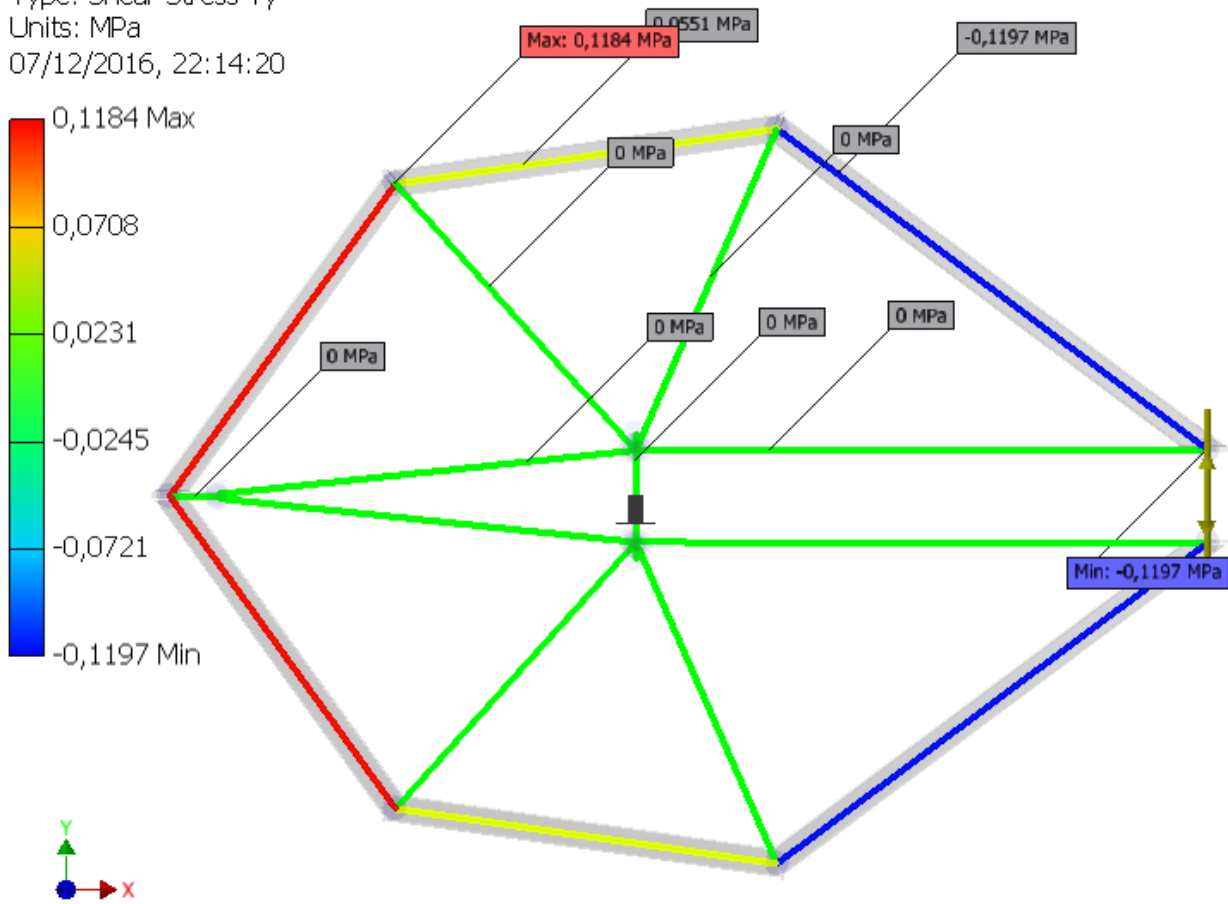
Tx

Type: Shear Stress Tx
Units: MPa
07/12/2016, 22:14:20



☐ Ty

Type: Shear Stress Ty
Units: MPa
07/12/2016, 22:14:20

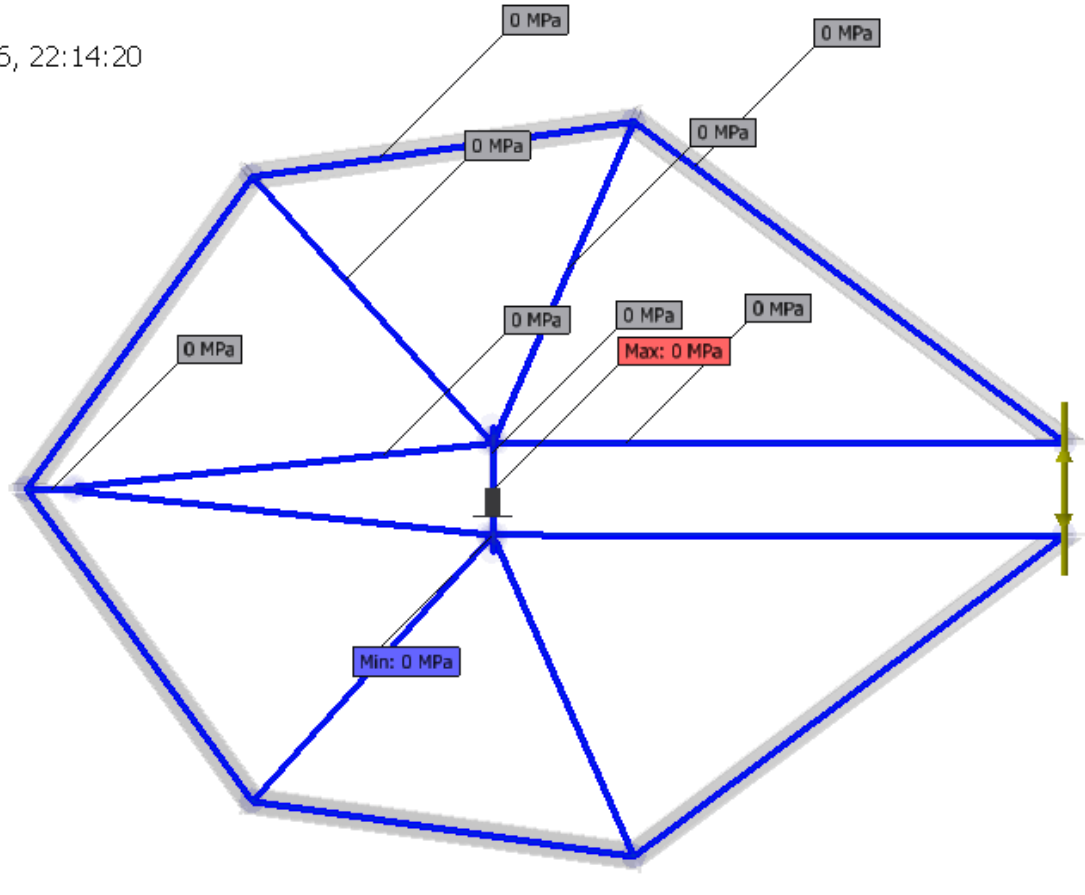
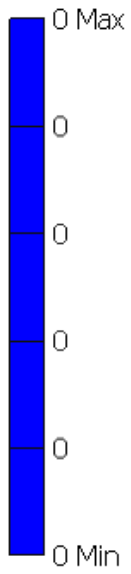


⊞ T

Type: Torsional Stress T

Units: MPa

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