

# Treliça\_tubo\_barra\_chata



Analyzed File:	teste.iam
Version:	2015 SP2 (Build 190223200, 223)
Creation Date:	15/02/2016, 16:31
Simulation Author:	Walter A. Kapp
Summary:	

## [-] Project Info (iProperties)

### [-] Summary

Author	Walter A. Kapp
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### [-] Project

Part Number	teste
Designer	Walter A. Kapp
Cost	R\$ 0,00
Date Created	15/02/2016

### [-] Status

Design Status	WorkInProgress
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### [-] Physical

Mass	375.177 kg
Area	94752.614 mm <sup>2</sup>
Volume	47732.429 mm <sup>3</sup>
Center of Gravity	x=100.521 mm y=-0.000 mm z=0.000 mm

## [-] Simulation:1

### General objective and settings:

Simulation Type	Static Analysis
Last Modification Date	15/02/2016, 16:25

### [-] Material(s)

Name	Steel, Mild
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General	Mass Density	7.860 g/cm <sup>3</sup>
	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 120x60x6 00000034.ipt ISO 120x60x6 00000035.ipt ISO 120x60x6 00000036.ipt ISO 120x60x6 00000037.ipt ISO 120x60x6 00000038.ipt ISO 120x60x6 00000039.ipt ISO 120x 20 00000033.ipt ISO 120x 20 00000029.ipt ISO 120x 20 00000025.ipt ISO 120x 20 00000032.ipt ISO 120x 20 00000031.ipt ISO 120x 20 00000030.ipt ISO 120x 20 00000028.ipt ISO 120x 20 00000027.ipt ISO 120x 20 00000026.ipt	

## ▣ Cross Section(s)

Geometry Properties	Section Area (A)	1954.195 mm <sup>2</sup>
	Section Width	60.000 mm
	Section Height	120.000 mm
	Section Centroid (x)	30.000 mm
	Section Centroid (y)	60.000 mm
Mechanical Properties	Moment of Inertia (I <sub>x</sub> )	3389109.720 mm <sup>4</sup>
	Moment of Inertia (I <sub>y</sub> )	1114209.230 mm <sup>4</sup>
	Torsional Rigidity Modulus (J)	2790000.000 mm <sup>4</sup>
	Section Modulus (W <sub>x</sub> )	56485.162 mm <sup>3</sup>
	Section Modulus (W <sub>y</sub> )	37140.308 mm <sup>3</sup>
	Torsional Section Modulus (W <sub>z</sub> )	63800.000 mm <sup>3</sup>
	Reduced Shear Area (A <sub>x</sub> )	607.390 mm <sup>2</sup>
Reduced Shear Area (A <sub>y</sub> )	1123.277 mm <sup>2</sup>	
Part Name(s)	ISO 120x60x6 00000034.ipt ISO 120x60x6 00000035.ipt ISO 120x60x6 00000036.ipt ISO 120x60x6 00000037.ipt ISO 120x60x6 00000038.ipt ISO 120x60x6 00000039.ipt	

Geometry Properties	Section Area (A)	2400.000 mm <sup>2</sup>
	Section Width	20.000 mm
	Section Height	120.000 mm
	Section Centroid (x)	10.000 mm
	Section Centroid (y)	60.000 mm
Mechanical Properties	Moment of Inertia (I <sub>x</sub> )	2880000.000 mm <sup>4</sup>
	Moment of Inertia (I <sub>y</sub> )	80000.000 mm <sup>4</sup>
	Torsional Rigidity Modulus (J)	286316.205 mm <sup>4</sup>
	Section Modulus (W <sub>x</sub> )	48000.000 mm <sup>3</sup>
	Section Modulus (W <sub>y</sub> )	8000.000 mm <sup>3</sup>
	Torsional Section Modulus (W <sub>z</sub> )	14317.721 mm <sup>3</sup>
	Reduced Shear Area (A <sub>x</sub> )	1600.000 mm <sup>2</sup>
Reduced Shear Area (A <sub>y</sub> )	1600.000 mm <sup>2</sup>	
Part Name(s)	ISO 120x 20 00000033.ipt ISO 120x 20 00000029.ipt ISO 120x 20 00000025.ipt	

Part Name(s)	ISO 120x 20 00000032.ipt ISO 120x 20 00000031.ipt ISO 120x 20 00000030.ipt ISO 120x 20 00000028.ipt ISO 120x 20 00000027.ipt ISO 120x 20 00000026.ipt
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**Beam Model**

Nodes	30
Beams	15
- Square/Rectangular Tubes	6
- Square/Rectangular/Hex Bars	9

**Operating conditions**

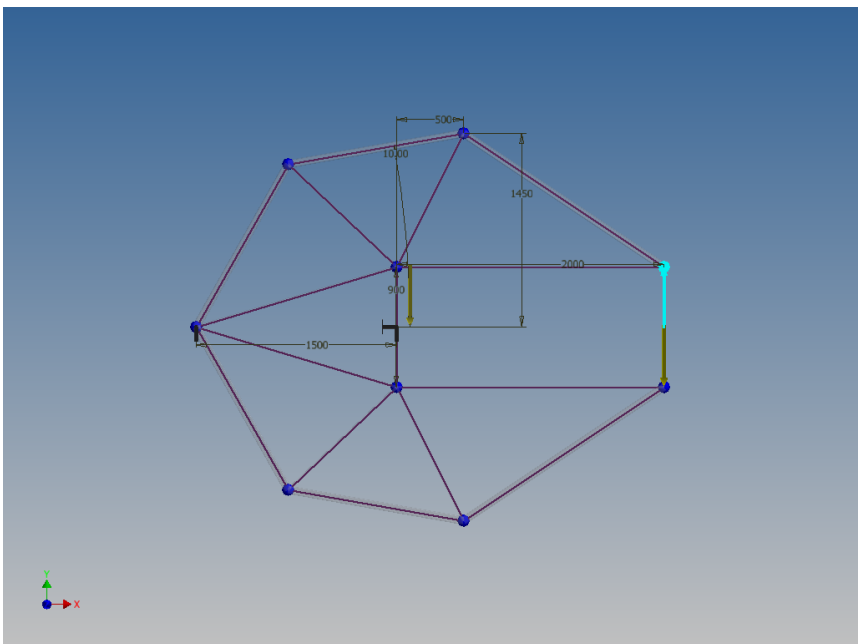
**Gravity**

Load Type	Gravity
Magnitude	9810.000 mm/s <sup>2</sup>
Direction	Y-

**Force:1**

Load Type	Force
Magnitude	30000.000 N
Beam Coordinate System	No
Angle of Plane	90.0 deg
Angle in Plane	90.0 deg
Fx	0.000 N
Fy	30000.000 N
Fz	0.000 N

**Selected Reference(s)**

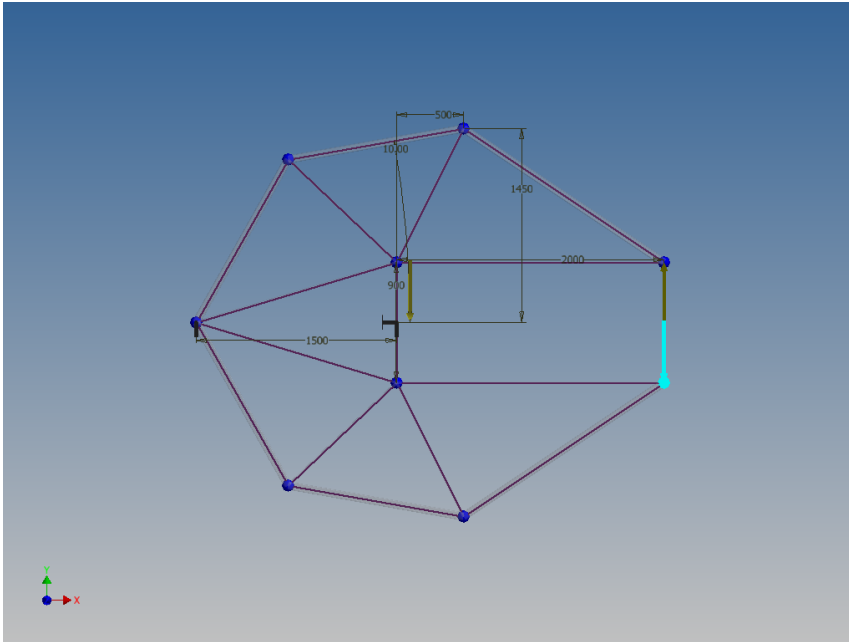


**Force:2**

Load Type	Force
Magnitude	30000.000 N
Beam Coordinate System	No

Angle of Plane	270.0 deg
Angle in Plane	90.0 deg
Fx	0.000 N
Fy	-30000.000 N
Fz	0.000 N

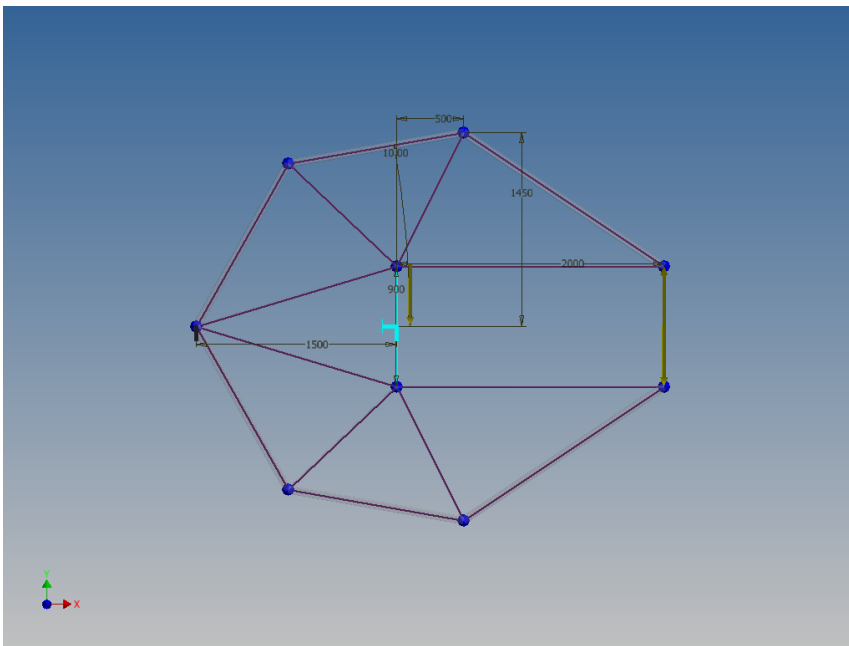
☐ Selected Reference(s)



☐ Custom Constraint:1

Constraint Type	Custom	
$\alpha$ - Rotation about axis Z	0.0 deg	
$\beta$ - Rotation about axis Y	0.0 deg	
$\gamma$ - Rotation about axis X	0.0 deg	
Offset	450.000 mm	
Displacement		
X - axis	fixed	0.000 N/mm
Y - axis	fixed	0.000 N/mm
Z - axis	fixed	0.000 N/mm
Rotation		
X - axis	fixed	0.000 N mm/deg
Y - axis	uplift none	0.000 N mm/deg
Z - axis	uplift none	0.000 N mm/deg

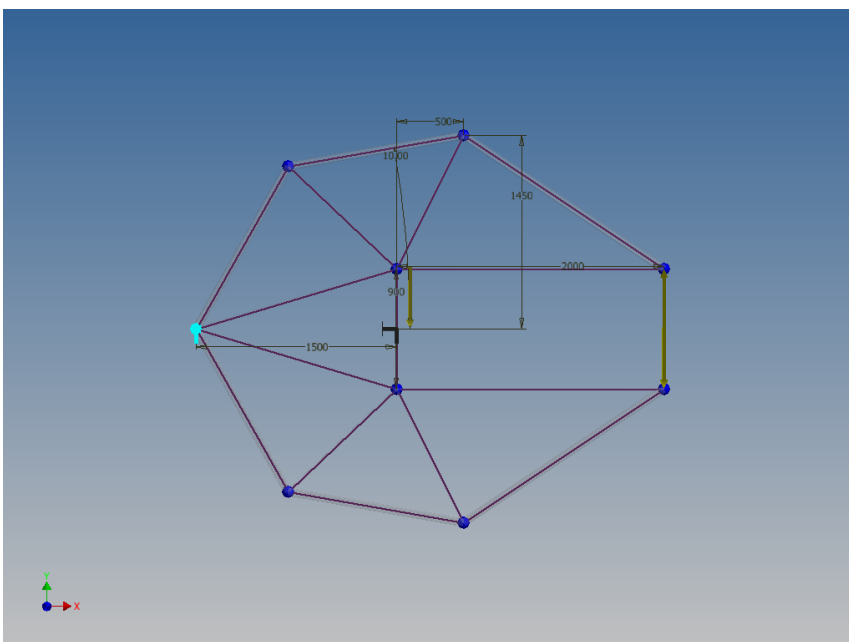
☐ Selected Reference(s)



### ☐ Custom Constraint:2

Constraint Type	Custom	
$\alpha$ - Rotation about axis Z	0.0 deg	
$\beta$ - Rotation about axis Y	0.0 deg	
$\gamma$ - Rotation about axis X	0.0 deg	
Displacement		
X - axis	uplift none	0.000 N/mm
Y - axis	fixed	0.000 N/mm
Z - axis	fixed	0.000 N/mm
Rotation		
X - axis	uplift none	0.000 N mm/deg
Y - axis	uplift none	0.000 N mm/deg
Z - axis	uplift none	0.000 N mm/deg

### ☐ Selected Reference(s)



### ☐ Results

## ☐ Reaction Force and Moment on Constraints

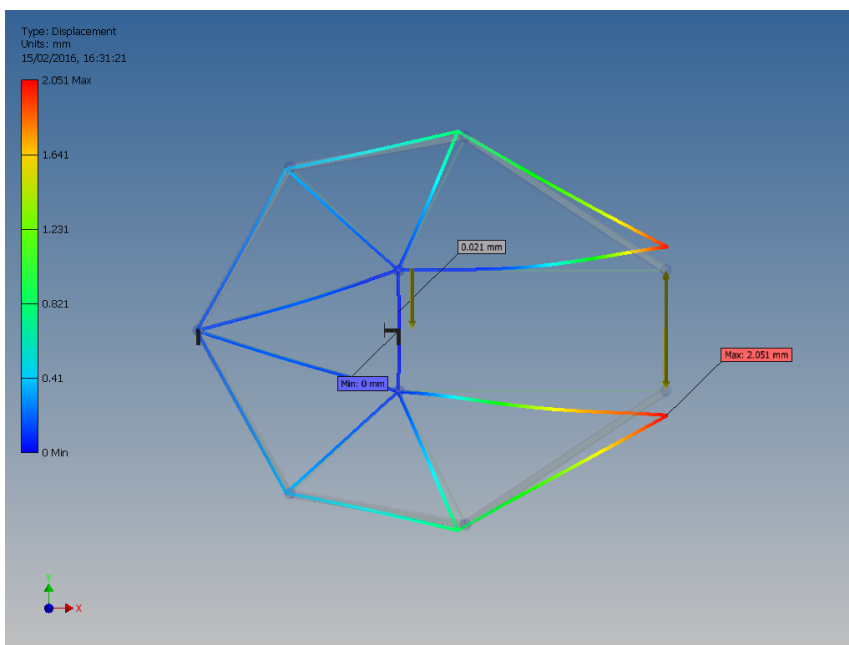
Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Components (Fx,Fy,Fz)	Magnitude	Components (Mx,My,Mz)
Custom Constraint:2	246.643 N	0.000 N	0.000 N mm	-0.000 N mm
		-246.643 N		-0.000 N mm
		0.000 N		-0.000 N mm
Custom Constraint:1	3927.129 N	0.000 N	0.000 N mm	-0.000 N mm
		3927.129 N		0.000 N mm
		-0.000 N		-0.000 N mm

## ☐ Static Result Summary

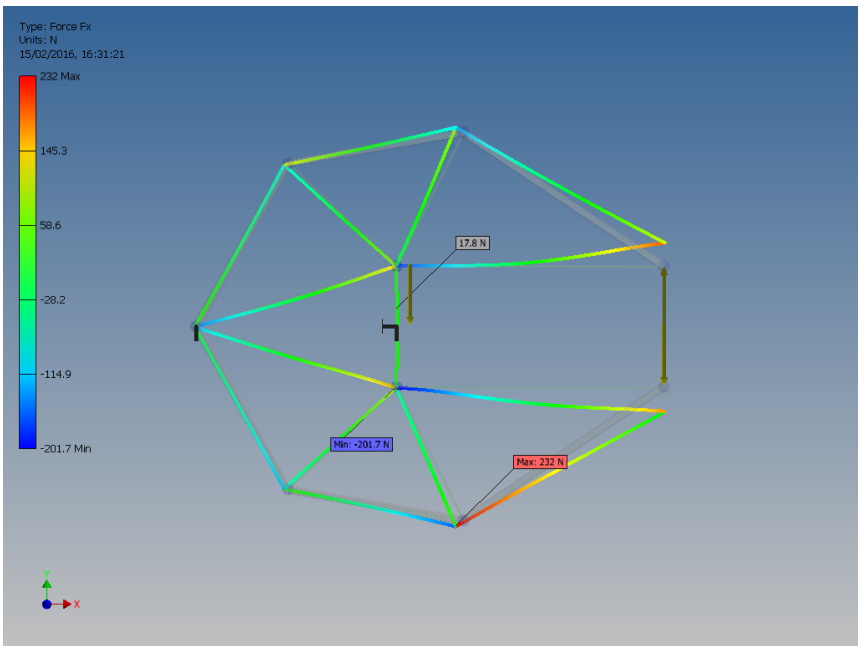
Name		Minimum	Maximum
Displacement		0.000 mm	2.051 mm
Forces	Fx	-201.657 N	232.037 N
	Fy	-0.000 N	0.000 N
	Fz	-71939.805 N	67495.658 N
Moments	Mx	-0.000 N mm	0.000 N mm
	My	-82545.296 N mm	165233.720 N mm
	Mz	-0.000 N mm	0.000 N mm
Normal Stresses	Smax	-32.641 MPa	32.746 MPa
	Smin	-38.770 MPa	28.168 MPa
	Smax(Mx)	-0.000 MPa	0.000 MPa
	Smin(Mx)	-0.000 MPa	0.000 MPa
	Smax(My)	0.000 MPa	10.318 MPa
	Smin(My)	-10.318 MPa	-0.000 MPa
	Saxial	-34.539 MPa	29.975 MPa
Shear Stresses	Tx	-0.382 MPa	0.265 MPa
	Ty	-0.000 MPa	0.000 MPa
Torsional Stresses	T	-0.000 MPa	0.000 MPa

## ☐ Figures

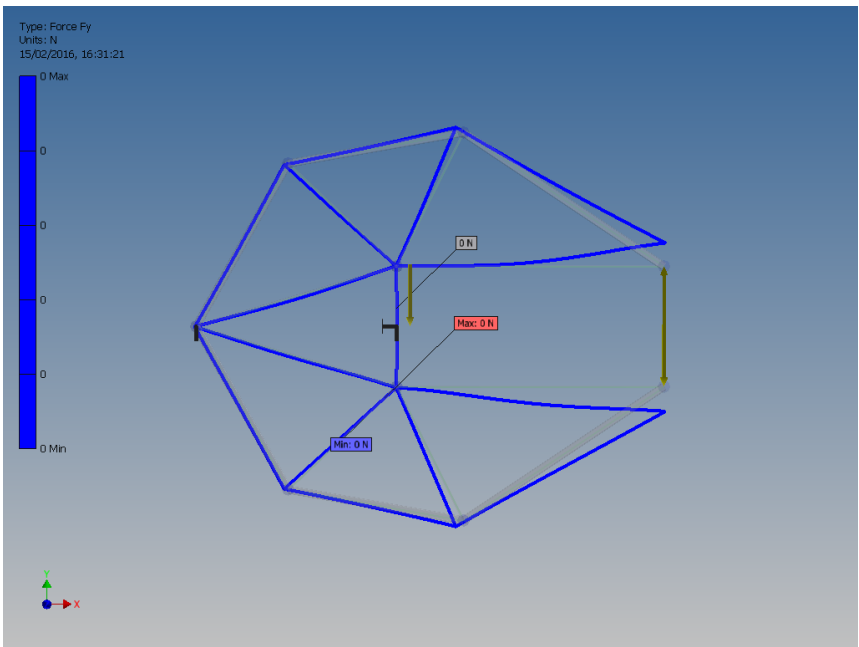
### ☐ Displacement



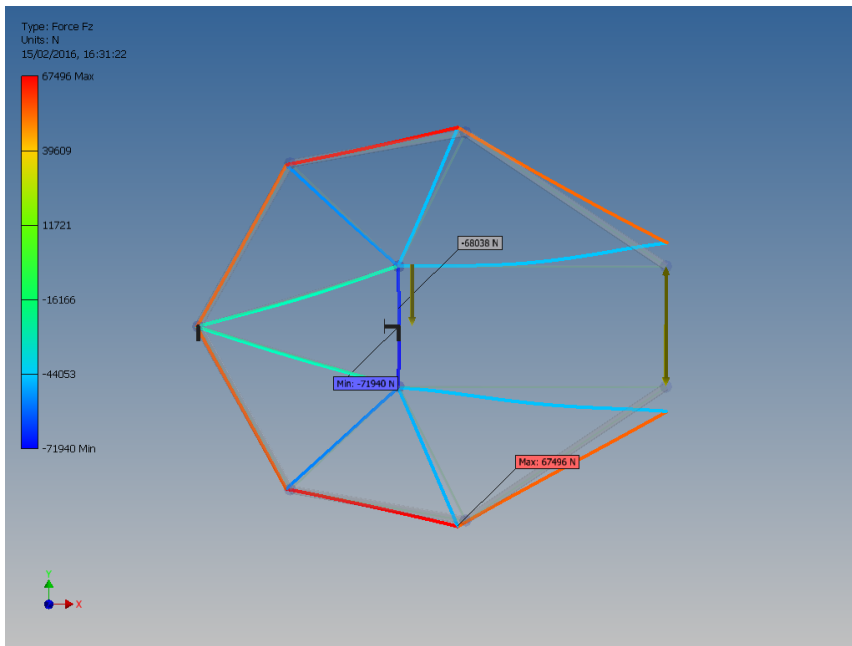
### ☐ Fx



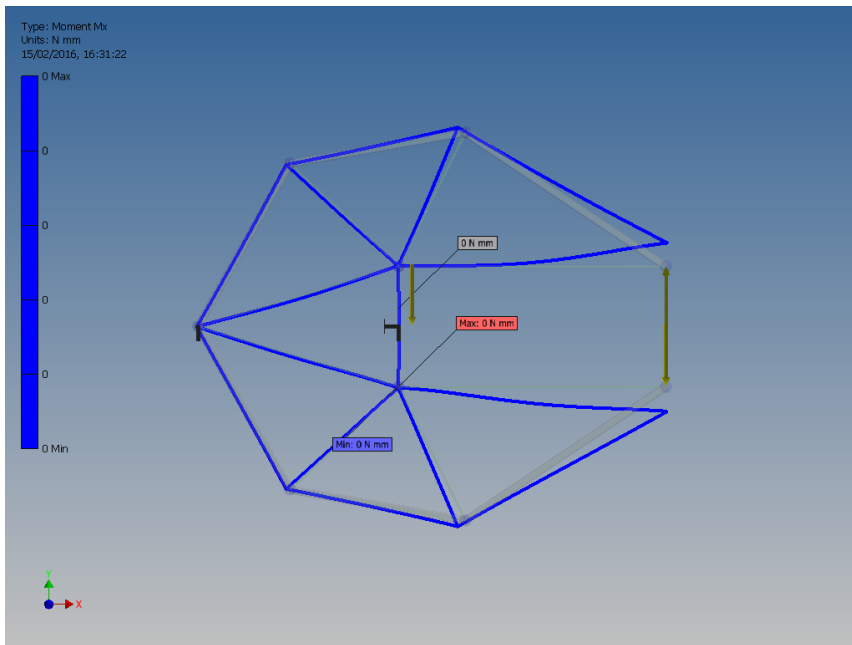
☐ **Fy**



☐ **Fz**

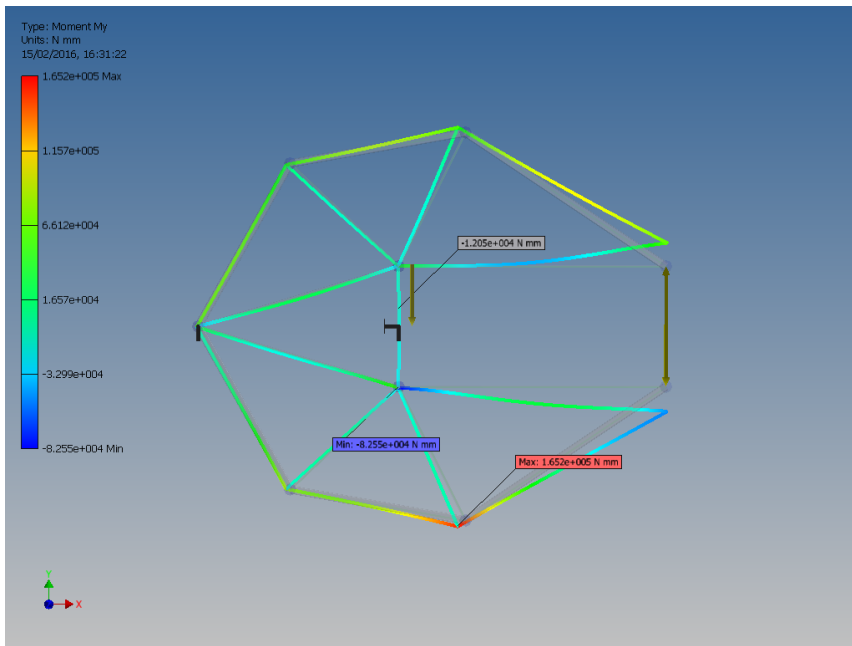


### ☐ Mx

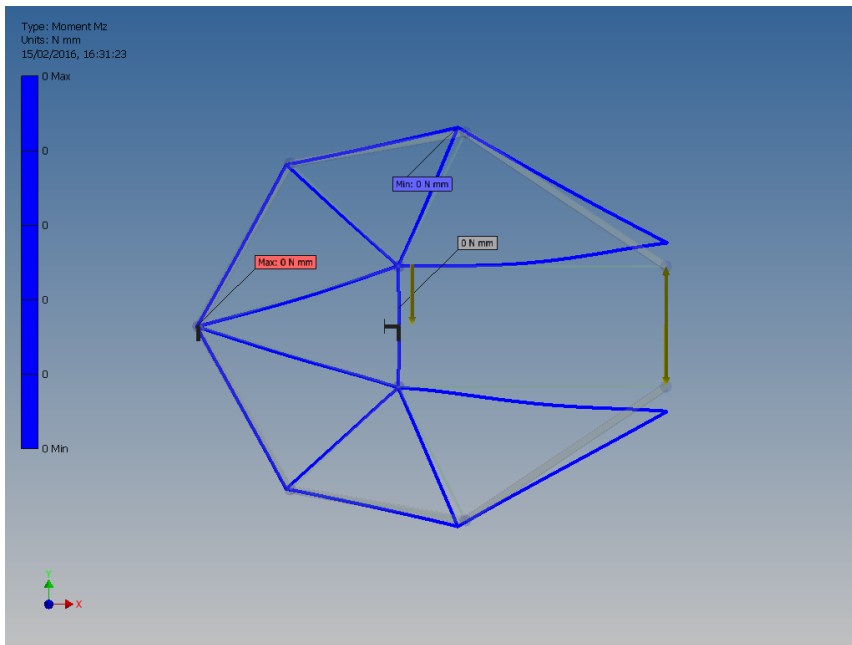


### ☐ My

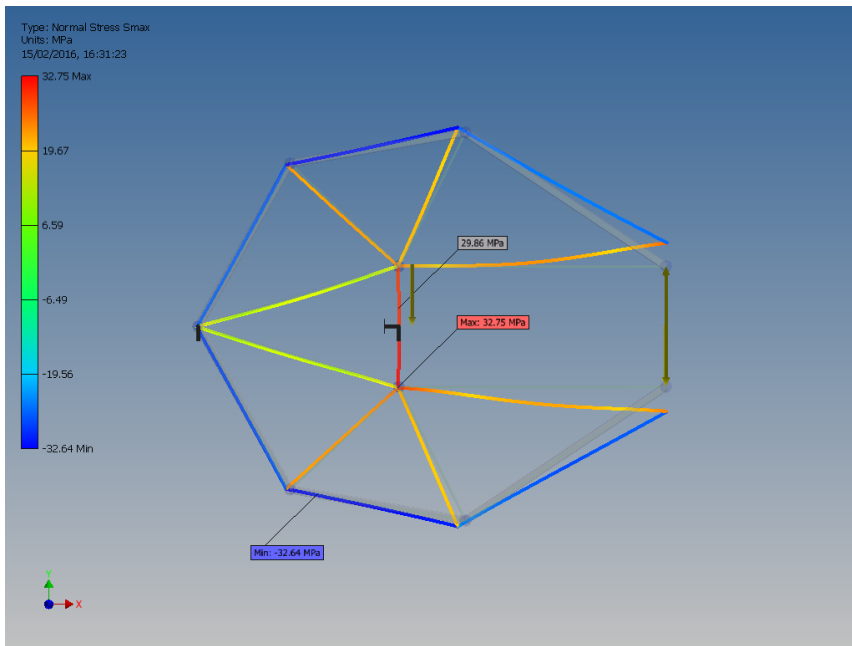




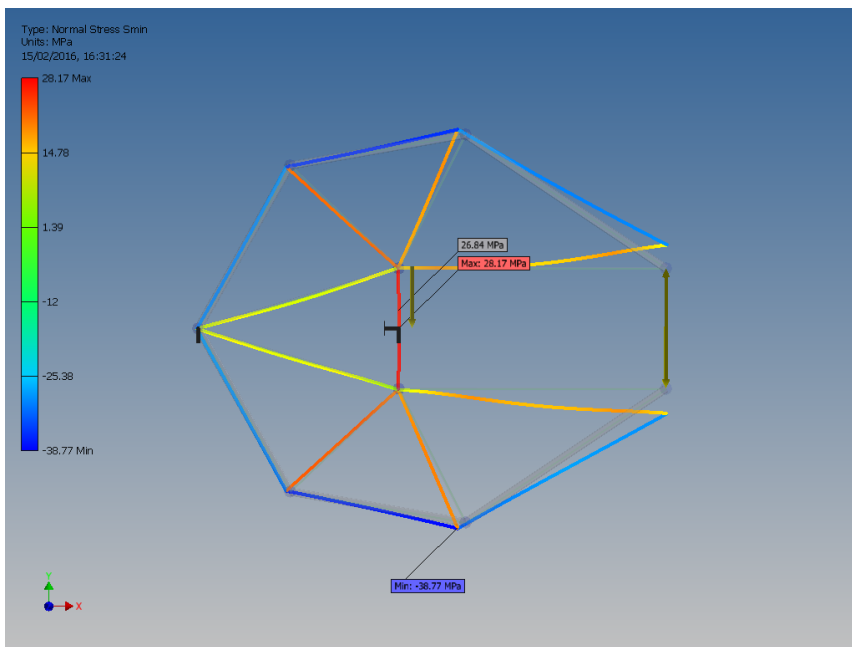
### ☐ Mz



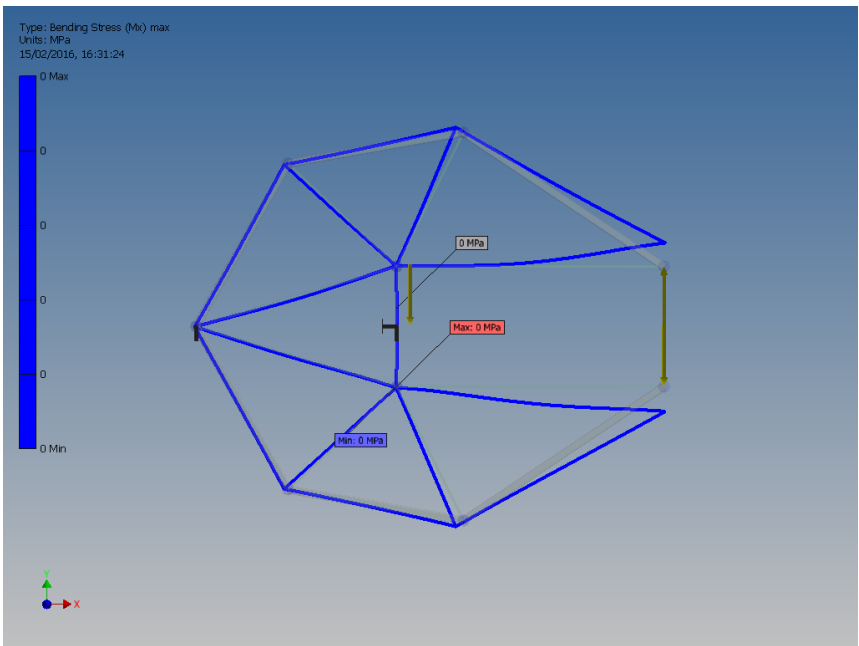
### ☐ Smax



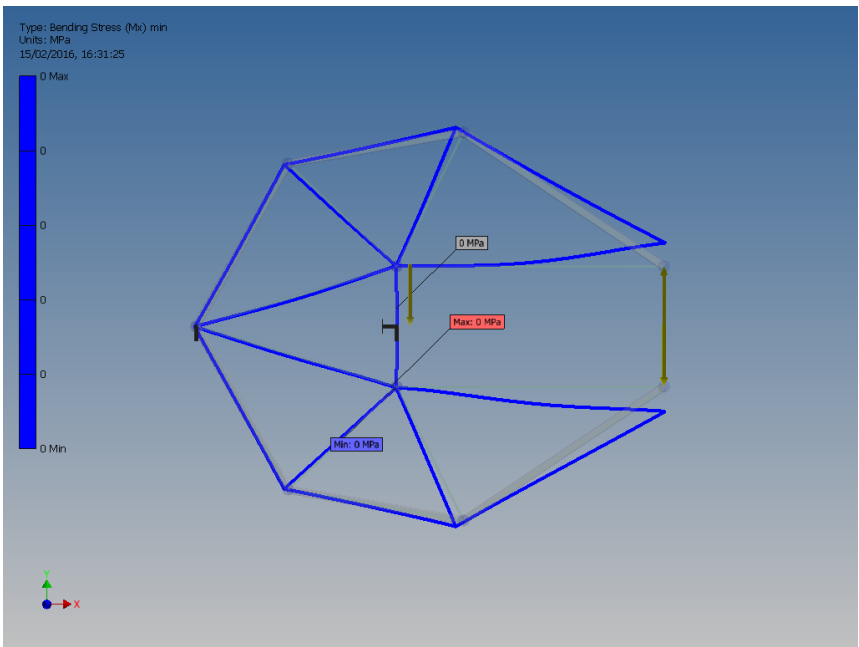
### ☐ Smin



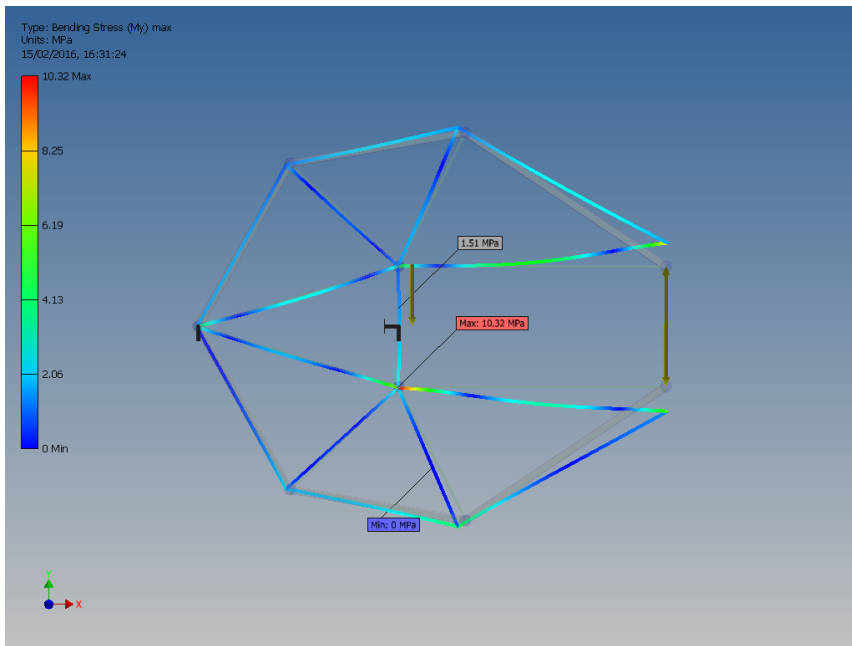
### ☐ Smax(Mx)



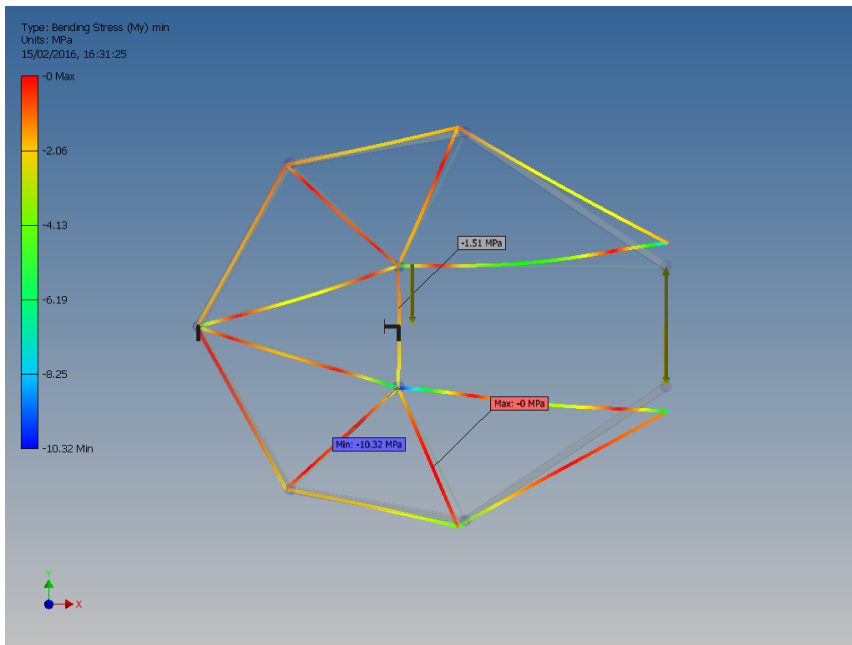
### ☐ Smin(Mx)



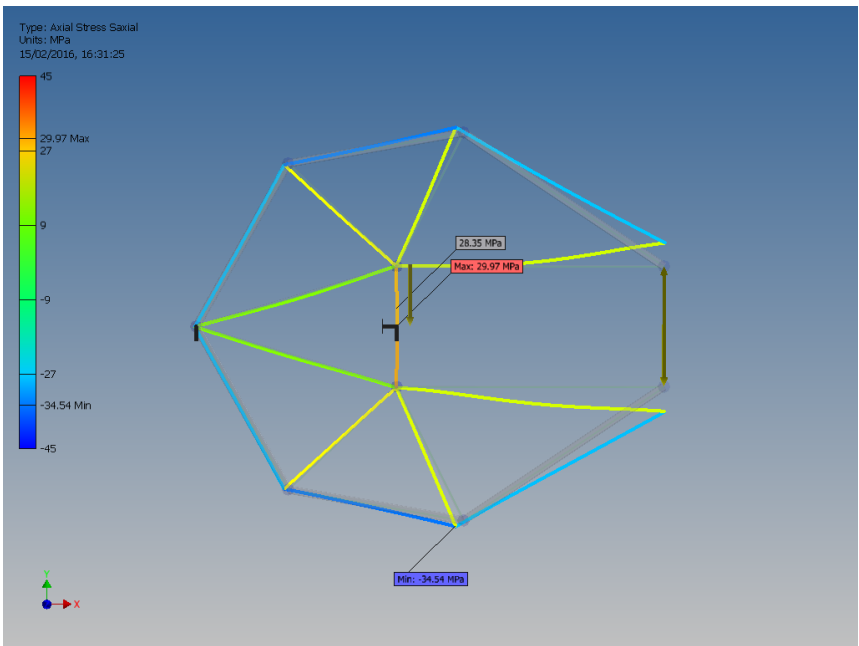
### ☐ Smax(My)



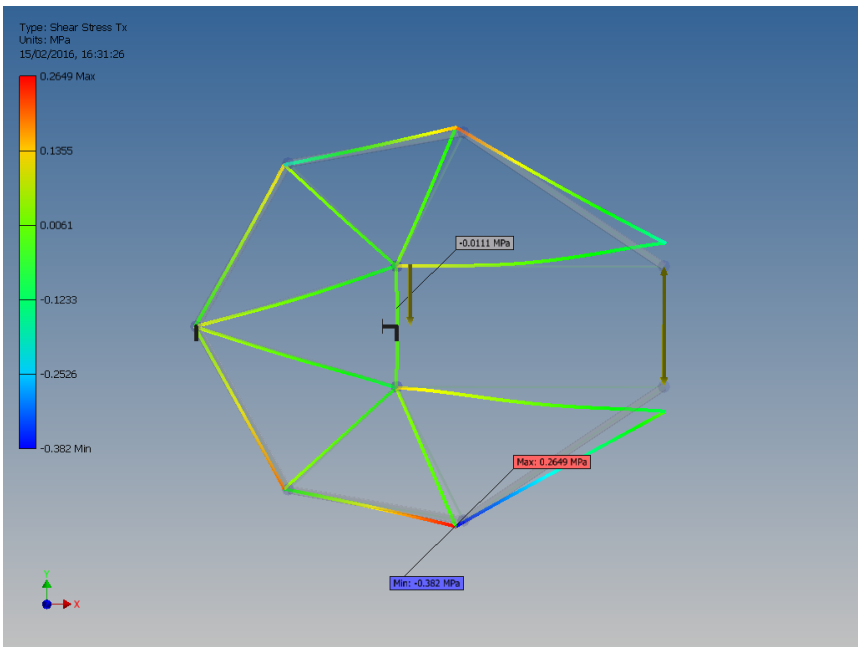
☐ **Smin(My)**



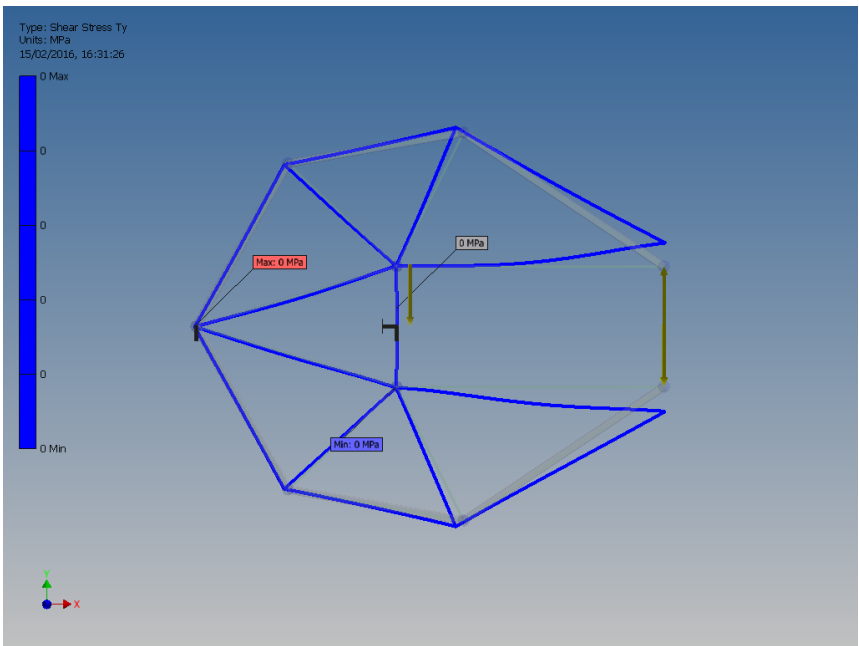
☐ **Saxial**



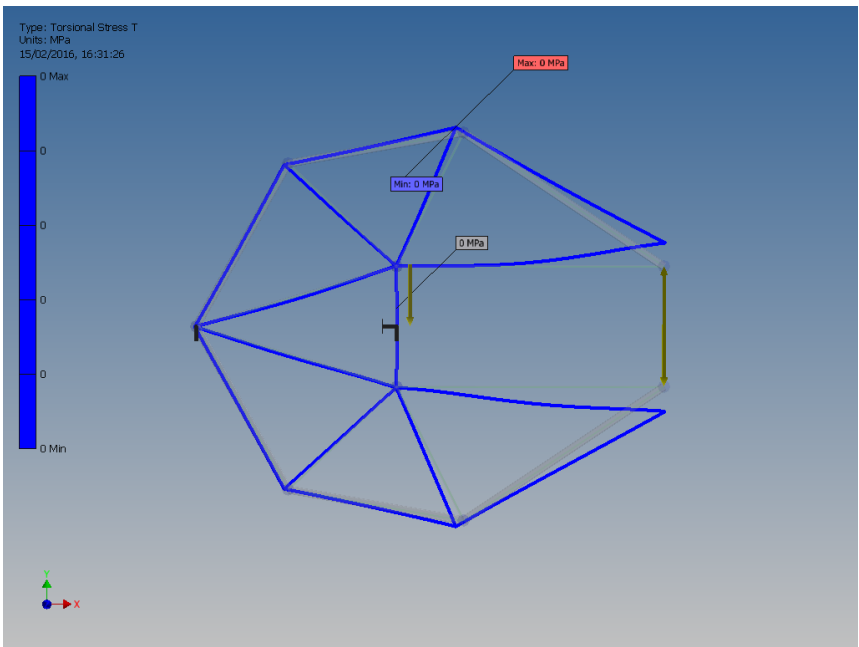
⊞ Tx



⊞ Ty



ET



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