

# Stress Analysis Report

# Autodesk®

Analyzed File:	Hoveddel.ipt
Autodesk Inventor Version:	2010 SP1 (Build 140253100, 253)
Creation Date:	06.05.2010, 14:38
Simulation Author:	Anders
Summary:	

## Project Info

### Summary

Author	Anders
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### Project

Part Number	Hoveddel
Designer	Anders
Cost	kr 0,00
Date Created	31.03.2010

### Status

Design Status	WorkInProgress
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### Physical

Material	Stainless Steel 316
Density	8 g/cm <sup>3</sup>
Mass	15,6455 kg
Area	325000 mm <sup>2</sup>
Volume	1955690 mm <sup>3</sup>
Center of Gravity	x=3,07941 mm y=286,771 mm z=57,9711 mm

## Simulation: 1

### General objective and settings:

Design Objective	Single Point
Simulation Type	Static Analysis
Last Modification Date	05.05.2010, 18:51
Detect and Eliminate Rigid Body Modes	Yes
Separate Stresses Across Contact Surfaces	No
Motion Loads Analysis	No

### Advanced settings:

Avg. Element Size (fraction of model diameter)	0,1
Min. Element Size (fraction of avg. size)	0,2
Grading Factor	1,5

Max. Turn Angle	60 deg
Create Curved Mesh Elements	Yes
Ignore Small Geometry	No
Use part based measure for Assembly mesh	Yes

### Material(s)

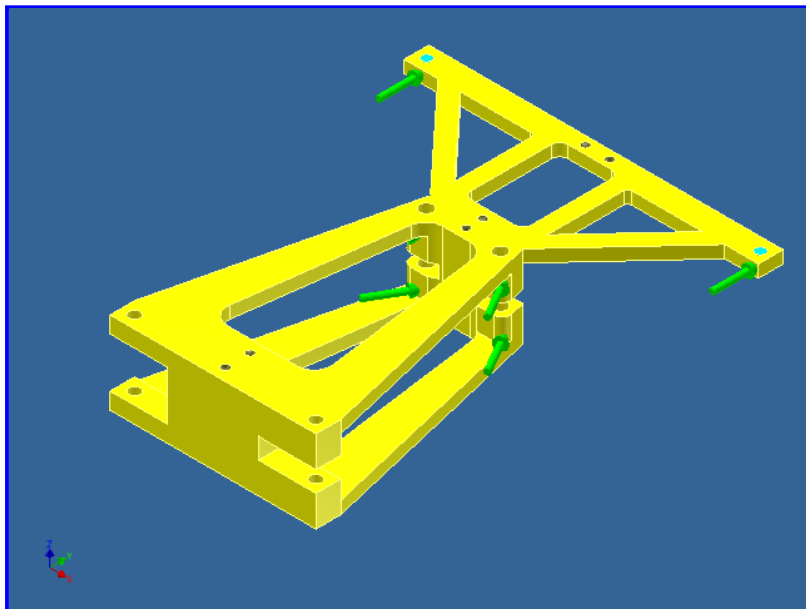
Name	Stainless Steel 316	
General	Mass Density	8 g/cm <sup>3</sup>
	Yield Strength	290 MPa
	Ultimate Tensile Strength	580 MPa
Stress	Young's Modulus	193 GPa
	Poisson's Ratio	0,3
	Shear Modulus	74,2308 GPa
Stress Thermal	Expansion Coefficient	0,0000104 ul/c
	Thermal Conductivity	16,3 W/( m K )
	Specific Heat	477 J/( kg c )
Part Name(s)	Hoveddel	

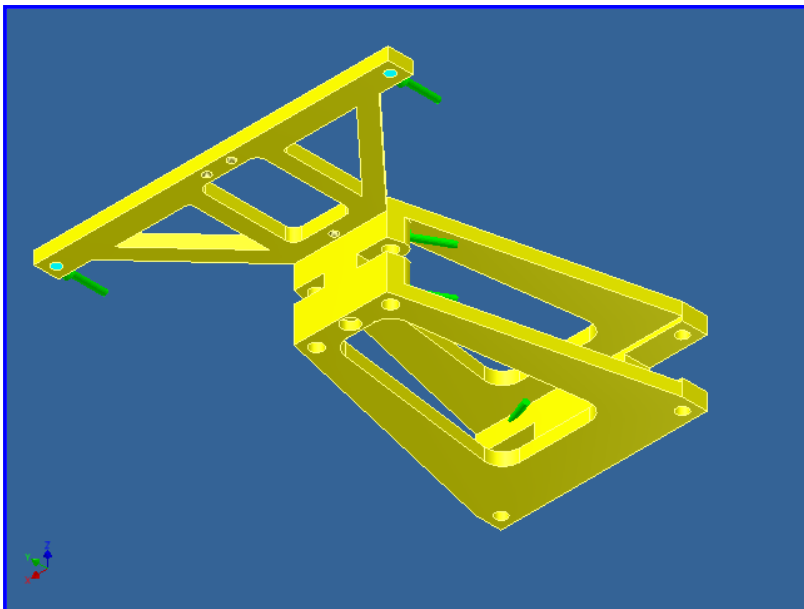
### Operating conditions

#### Force:1

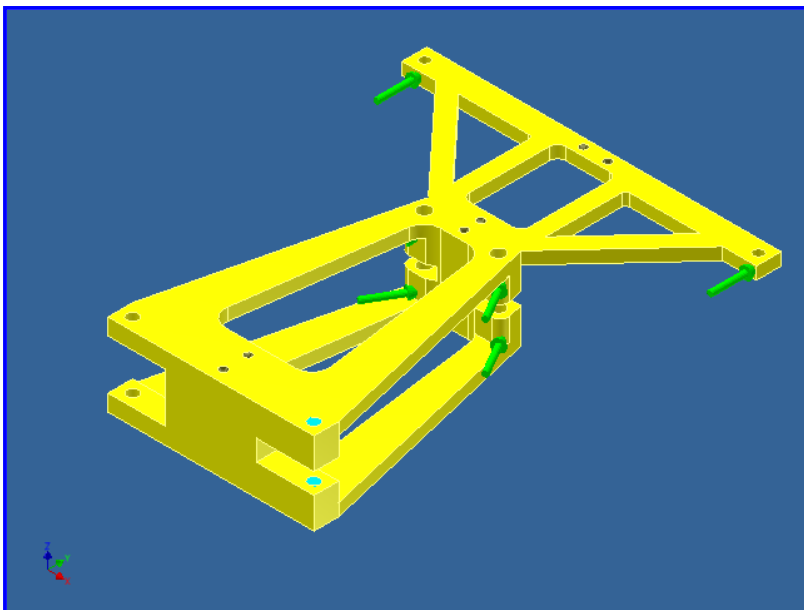
Load Type	Force
Vector X	0,000 N
Vector Y	10000,000 N
Vector Z	0,000 N

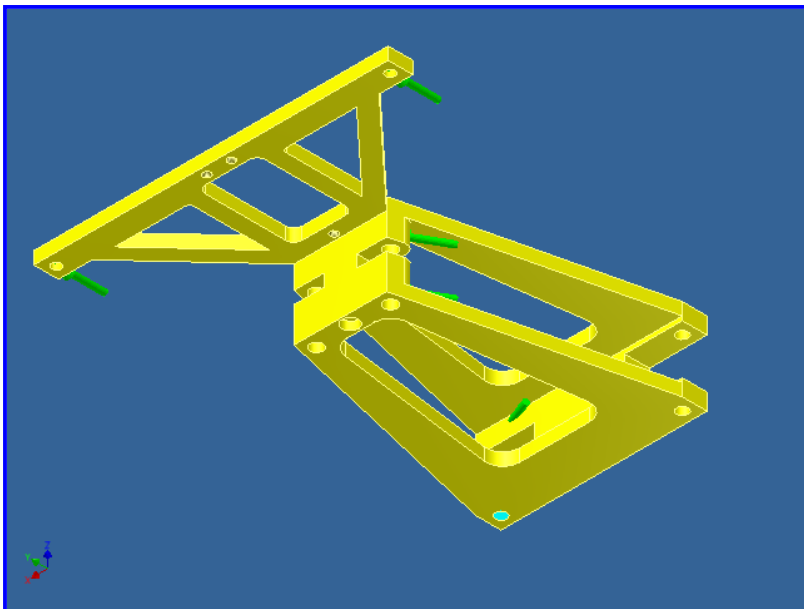
#### Selected Face(s)



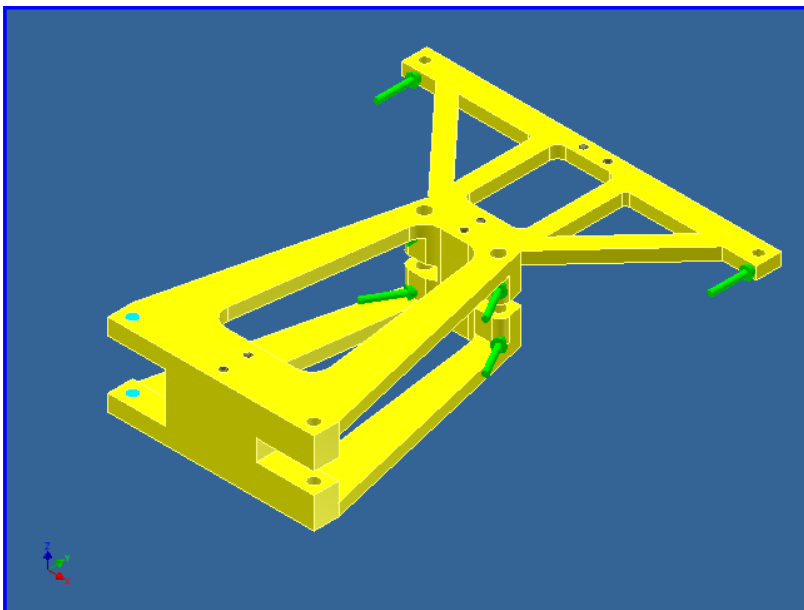
**Force:4**

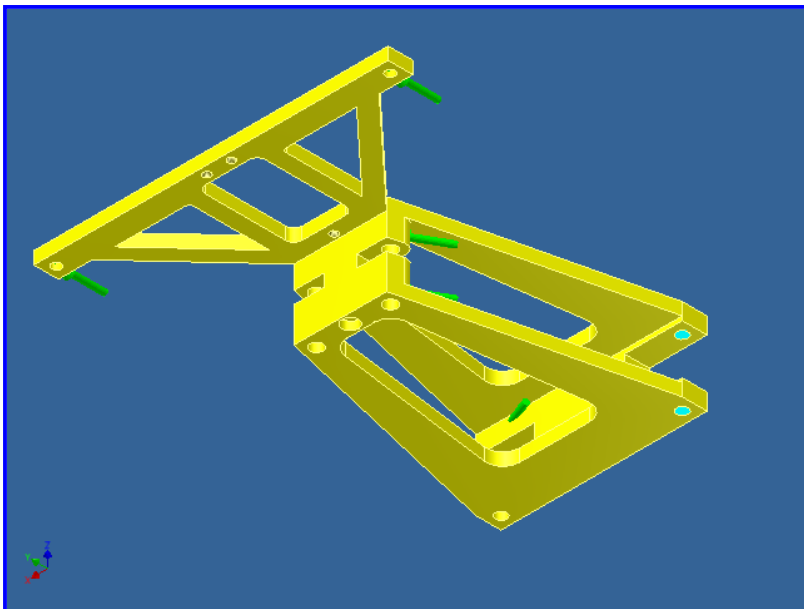
Load Type	Force
Vector X	28995,000 N
Vector Y	-11100,000 N
Vector Z	0,000 N

**Selected Face(s)**

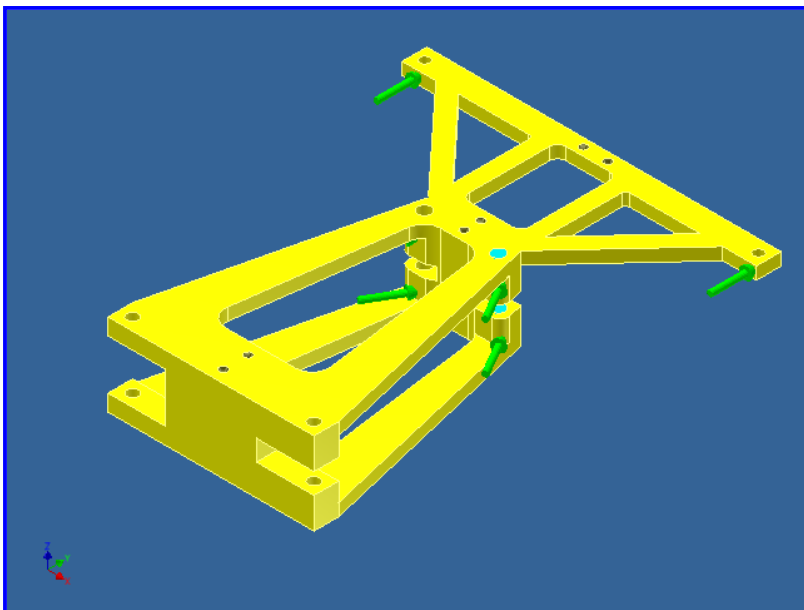
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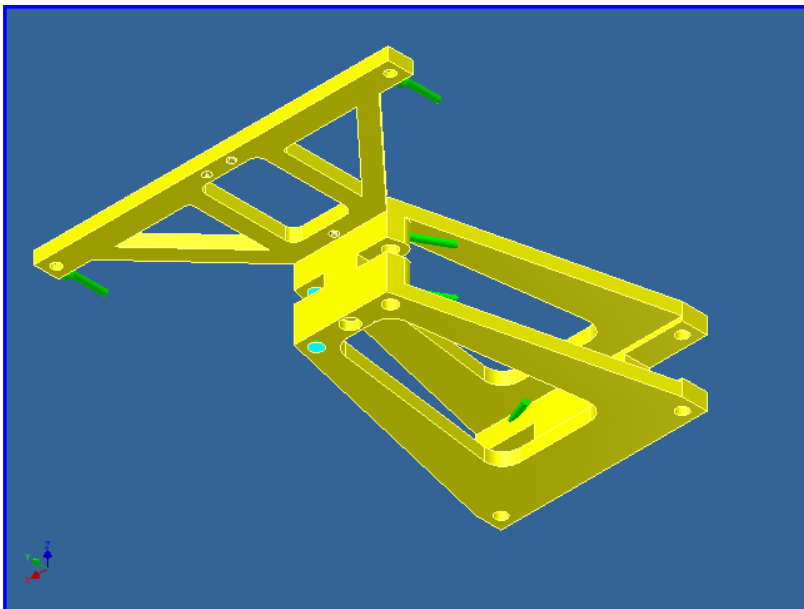
Load Type	Force
Vector X	-28995,000 N
Vector Y	-111100,000 N
Vector Z	0,000 N

**Selected Face(s)**

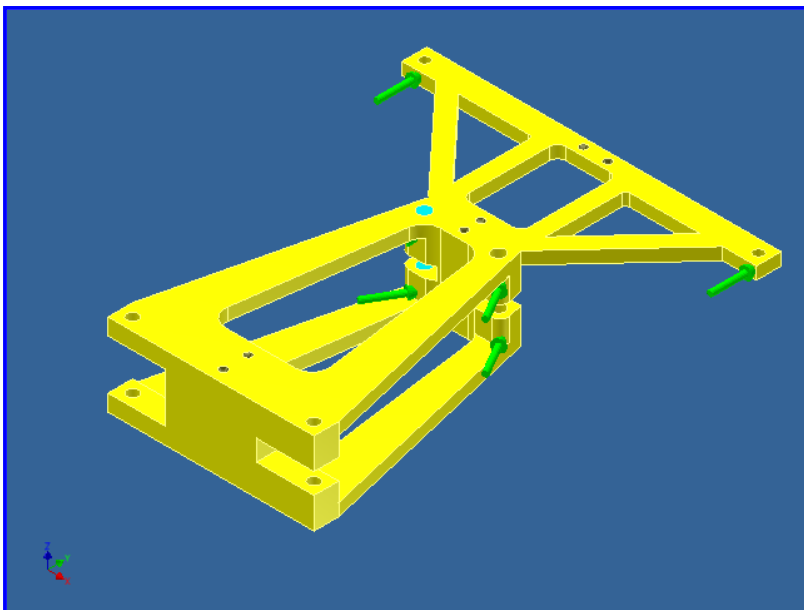
**Force:2**

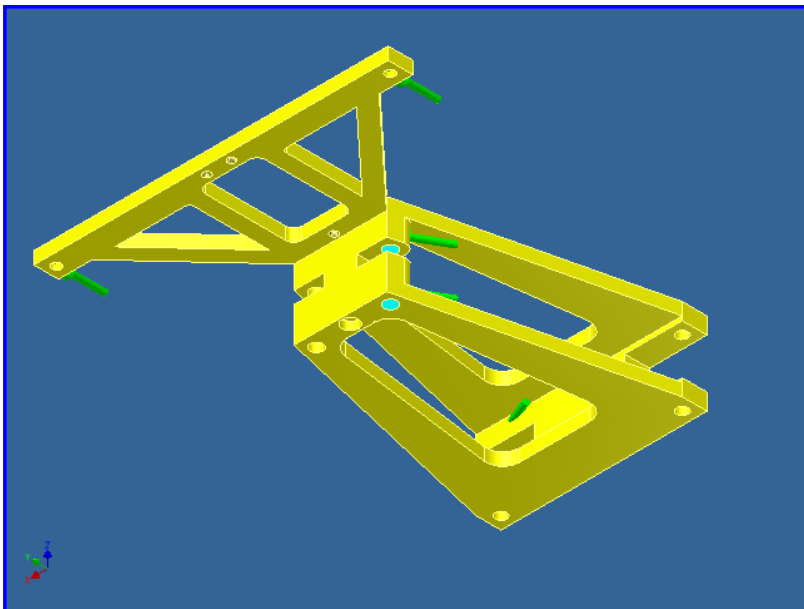
Load Type	Force
Vector X	-11000,000 N
Vector Y	19100,000 N
Vector Z	0,000 N

**Selected Face(s)**

**Force:3**

Load Type	Force
Vector X	11000,000 N
Vector Y	19100,000 N
Vector Z	0,000 N

**Selected Face(s)**



## ▣ Results

### ▣ Reaction Force and Moment on Constraints

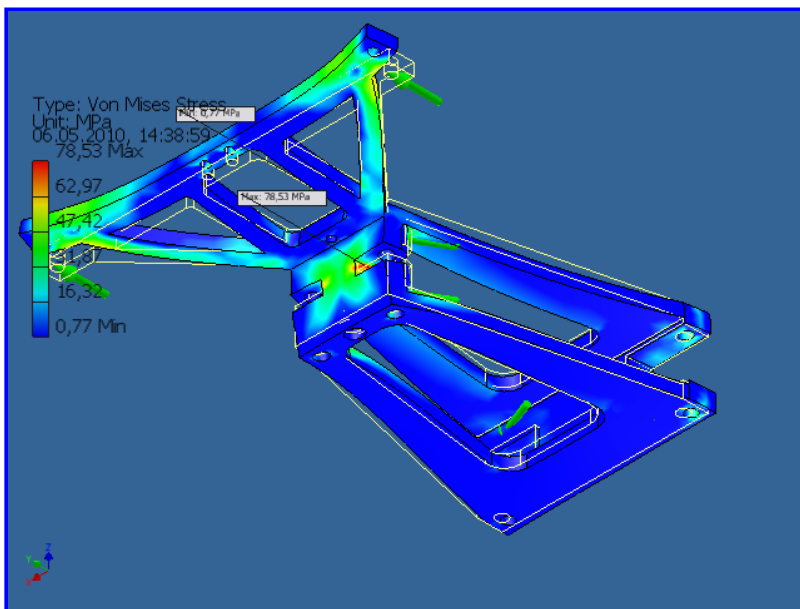
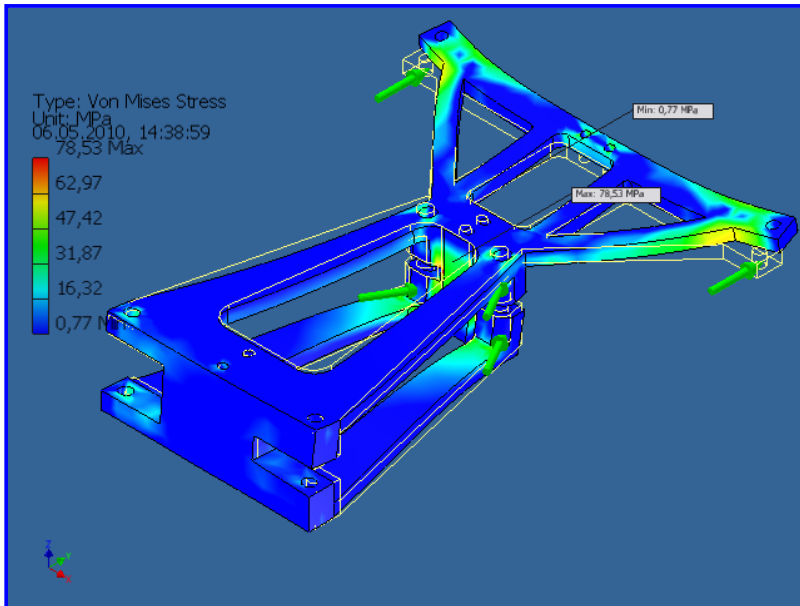
Constraint Name	Reaction Force		Reaction Moment	
	Magnitude	Component (X,Y,Z)	Magnitude	Component (X,Y,Z)

### ▣ Result Summary

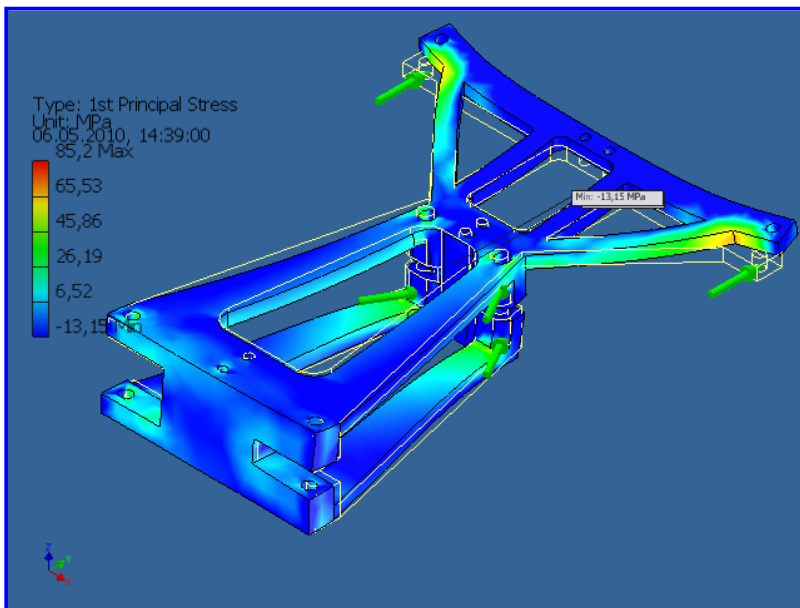
Name	Minimum	Maximum
Volume	1955570 mm <sup>3</sup>	
Mass	0 kg	
Von Mises Stress	0,769802 MPa	78,5251 MPa
1st Principal Stress	-13,1533 MPa	85,2009 MPa
3rd Principal Stress	-97,4033 MPa	9,88305 MPa
Displacement	0,00390633 mm	0,156489 mm
Safety Factor	5,95463 ul	15 ul
Stress XX	-56,7812 MPa	65,7694 MPa
Stress XY	-31,2751 MPa	32,3046 MPa
Stress XZ	-34,4142 MPa	33,7926 MPa
Stress YY	-37,3383 MPa	56,3192 MPa
Stress YZ	-12,6579 MPa	18,1933 MPa
Stress ZZ	-81,3991 MPa	79,1762 MPa
X Displacement	-0,0372381 mm	0,0279533 mm
Y Displacement	-0,0425525 mm	0,125494 mm
Z Displacement	-0,0490387 mm	0,0874729 mm
Equivalent Strain	0,00000345715 ul	0,000377099 ul
1st Principal Strain	-0,00000116816 ul	0,000402729 ul
3rd Principal Strain	-0,000443432 ul	-0,00000182904 ul
Strain XX	-0,000288484 ul	0,000310871 ul
Strain XY	-0,000210661 ul	0,000217596 ul
Strain XZ	-0,000231806 ul	0,000227619 ul
Strain YY	-0,000181161 ul	0,000262557 ul
Strain YZ	-0,0000852605 ul	0,000122546 ul
Strain ZZ	-0,000399854 ul	0,000362148 ul

## ▣ Figures

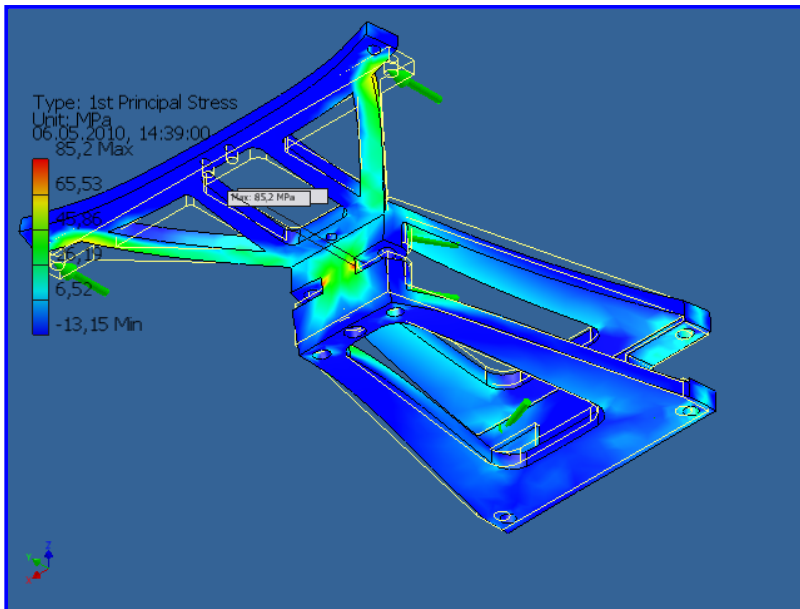
### Von Mises Stress



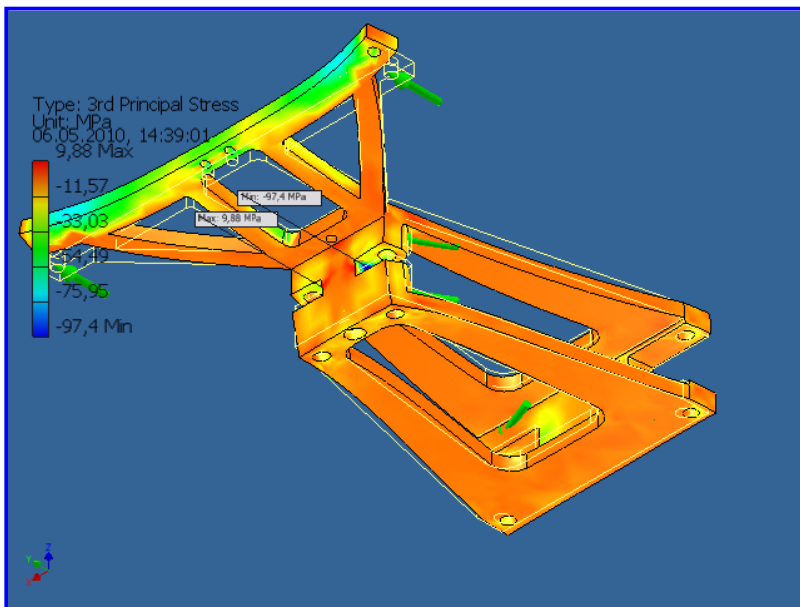
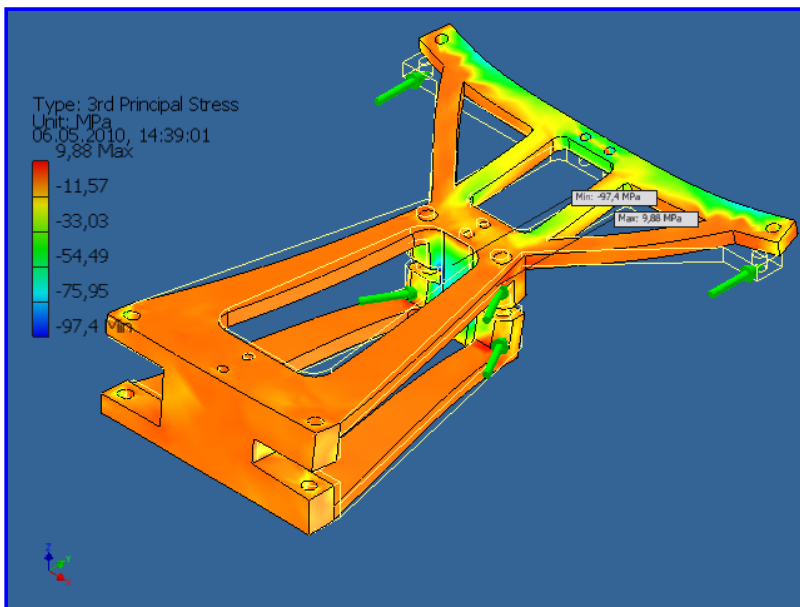
### 1st Principal Stress



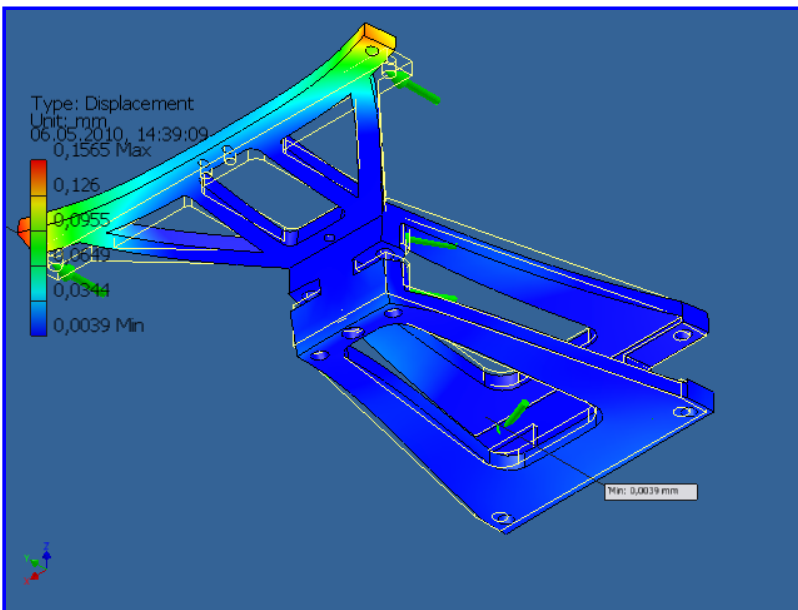
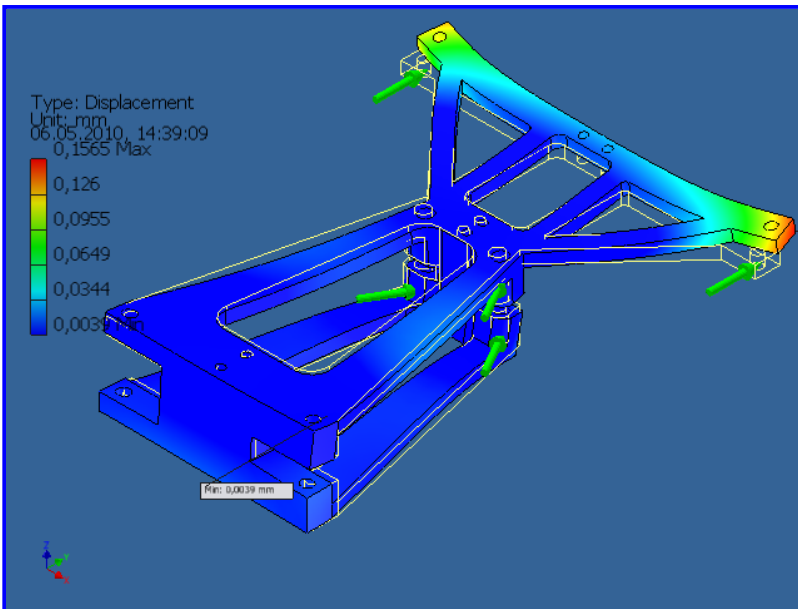




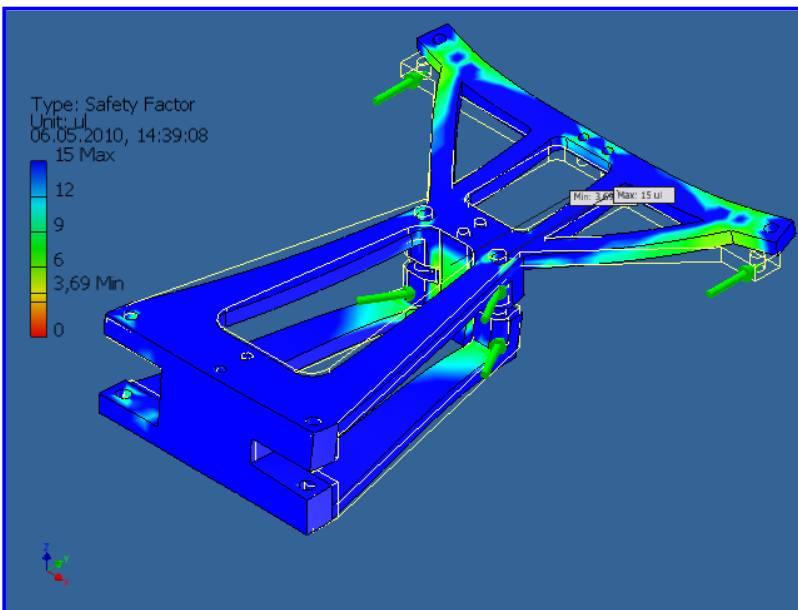
3rd Principal Stress

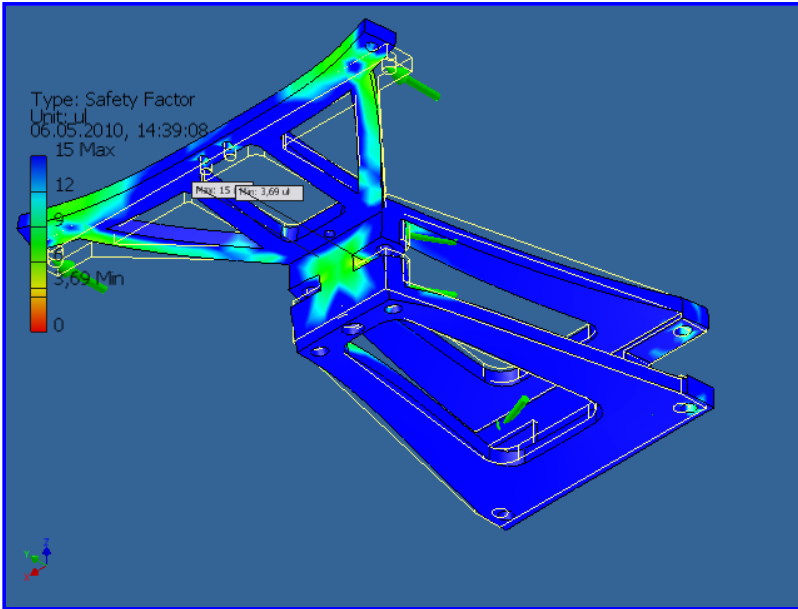


Displacement

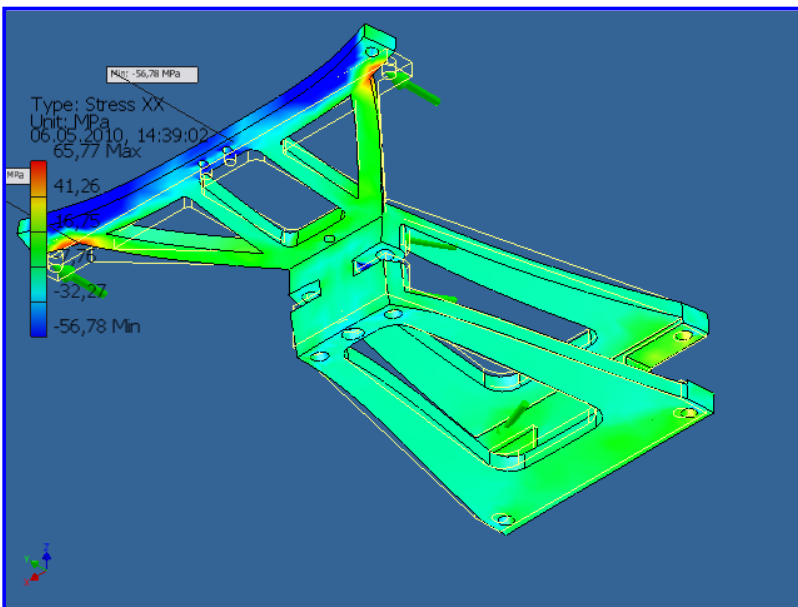
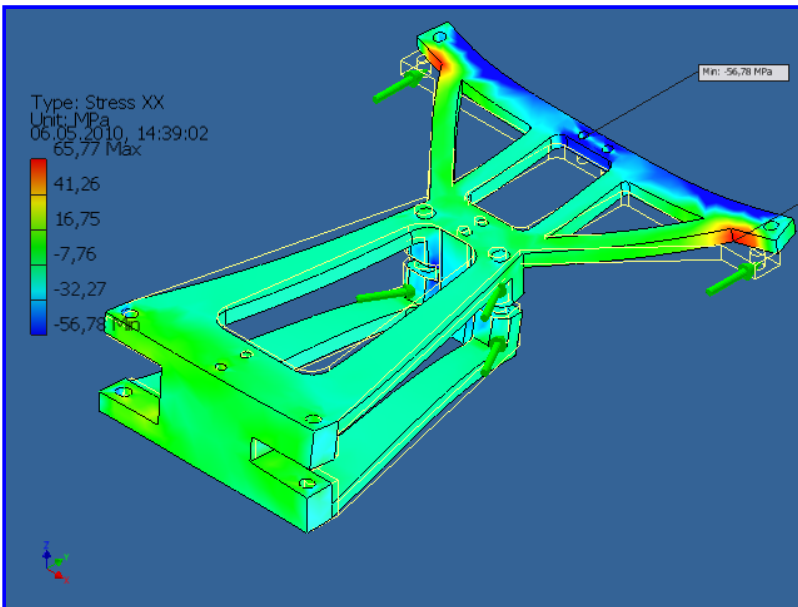


### ☐ Safety Factor

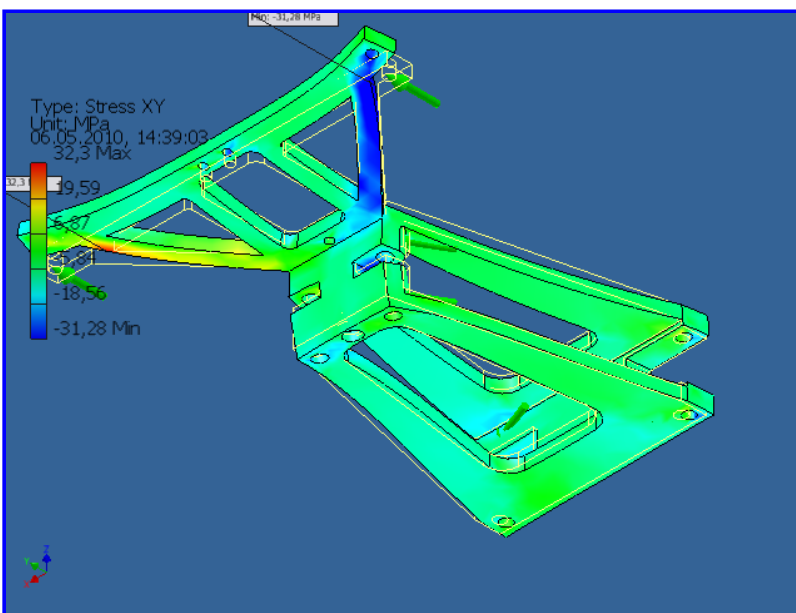
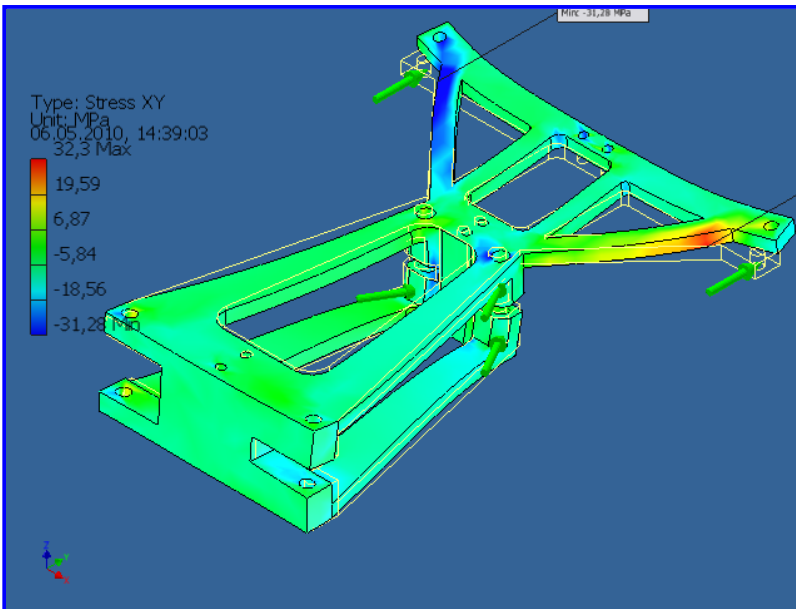




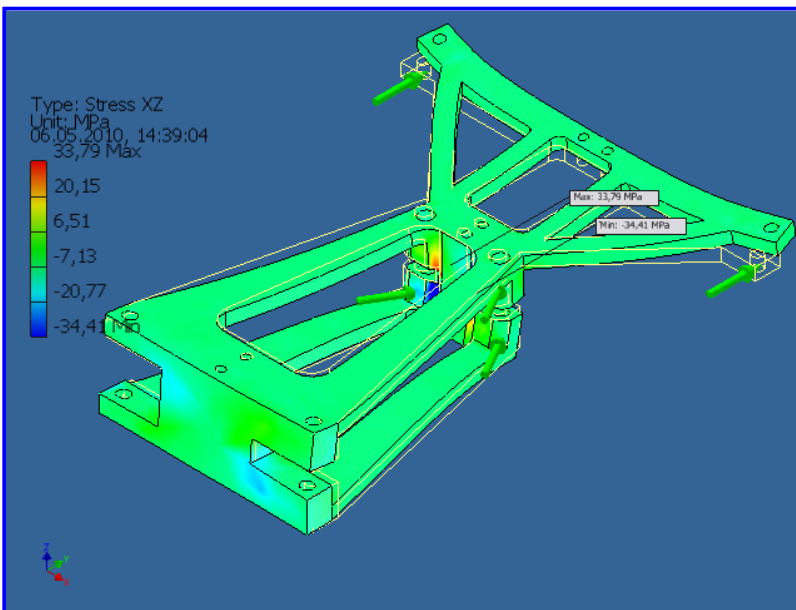
☐ Stress XX

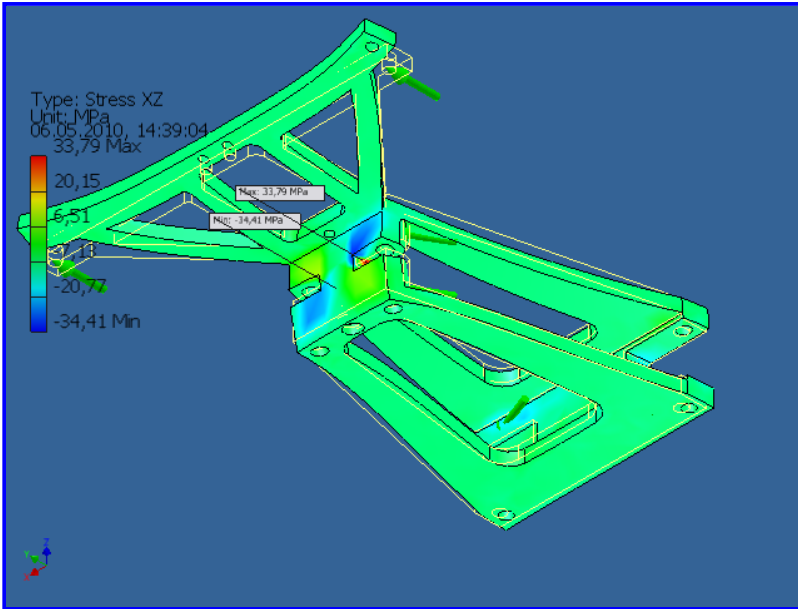


☐ Stress XY

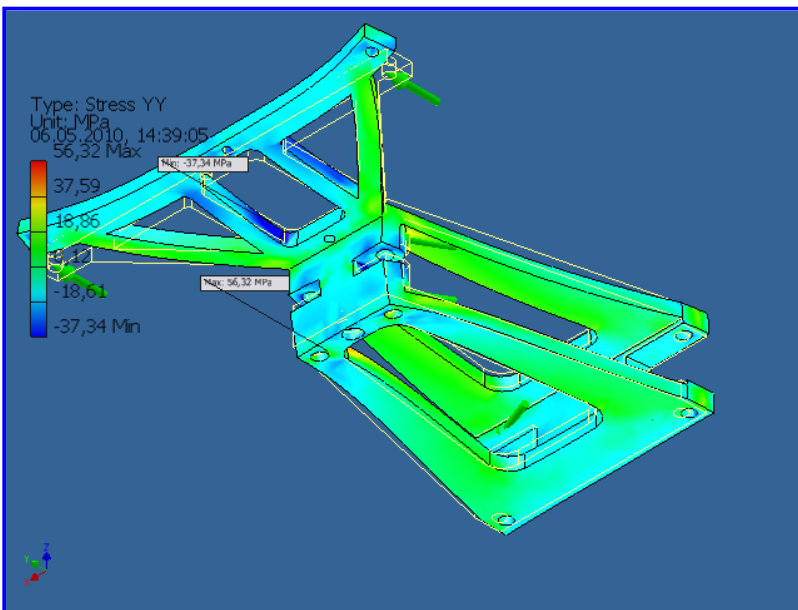
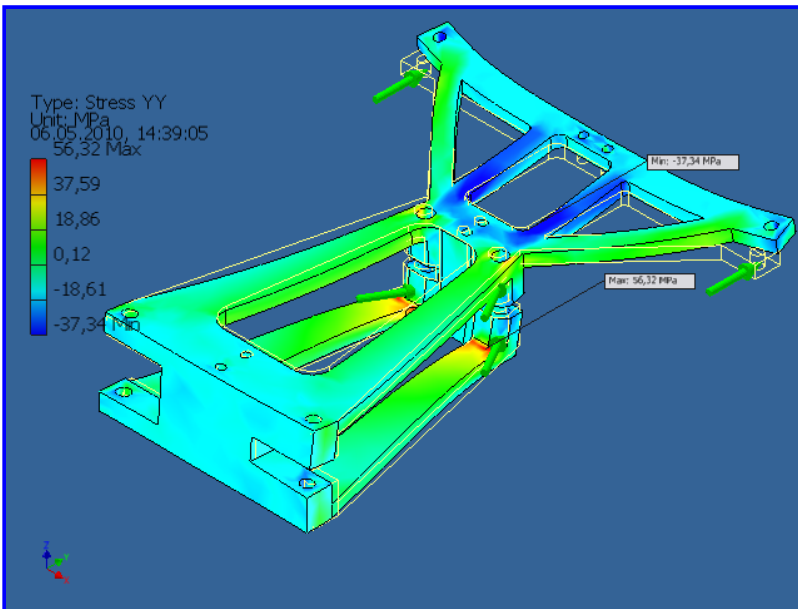


☐ Stress XZ

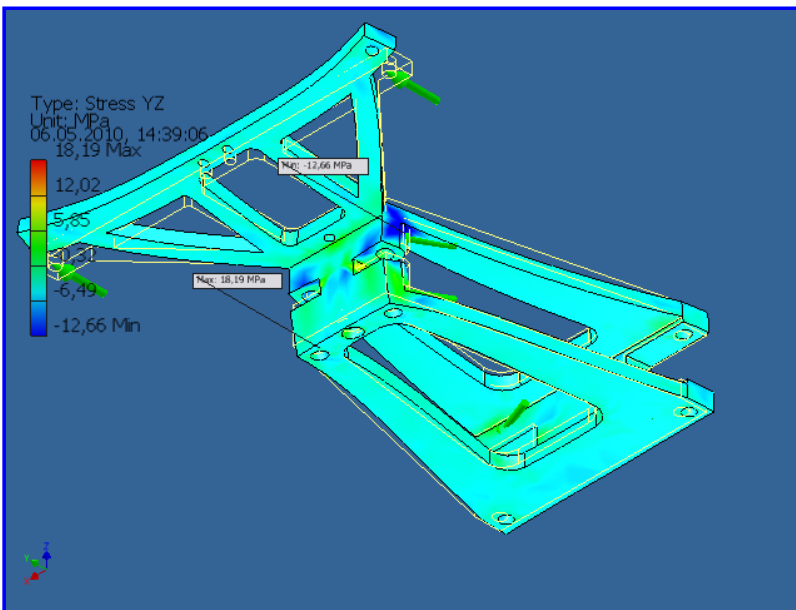
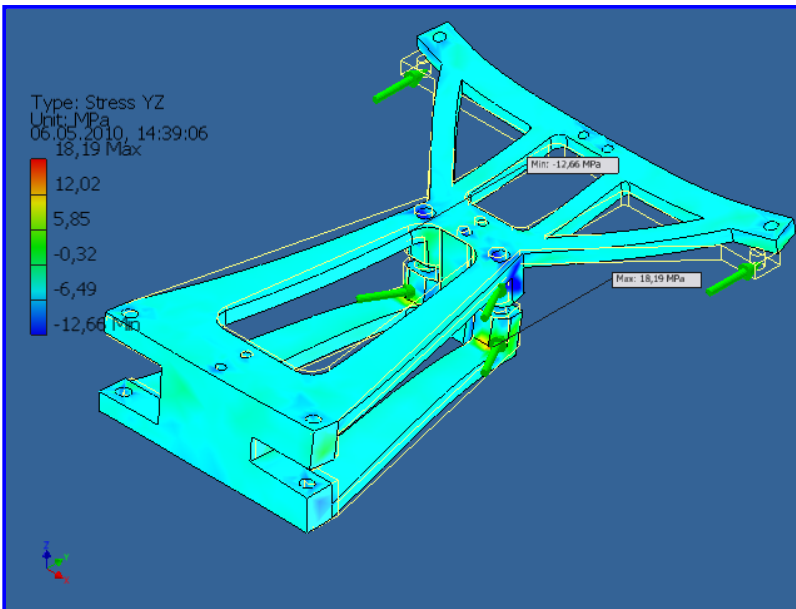




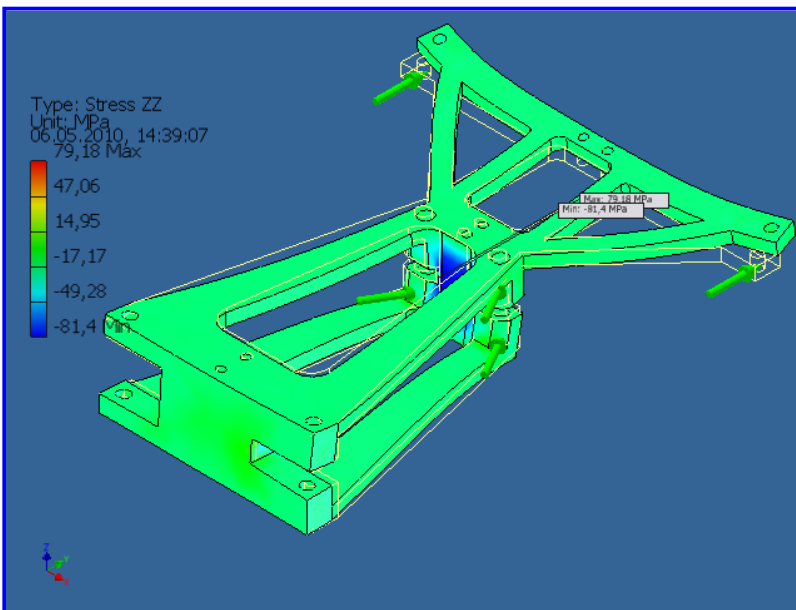
☐ Stress YY

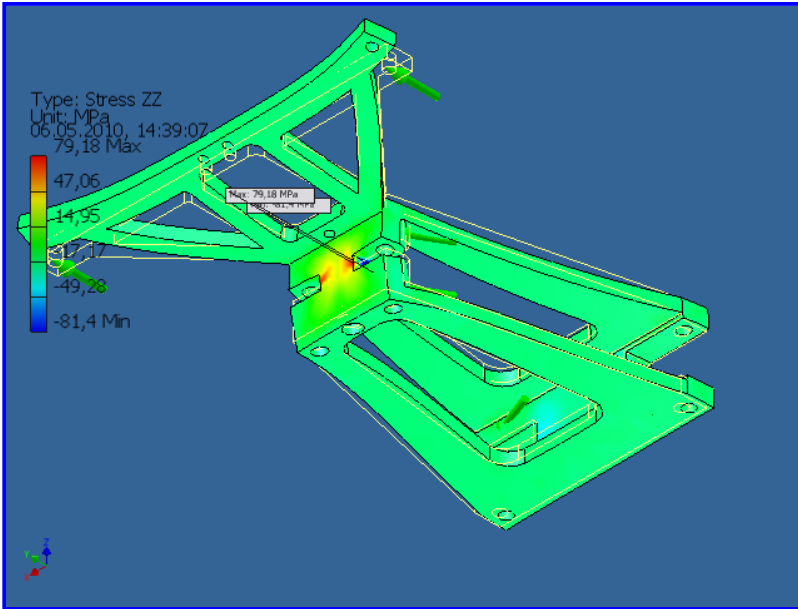


☐ Stress YZ

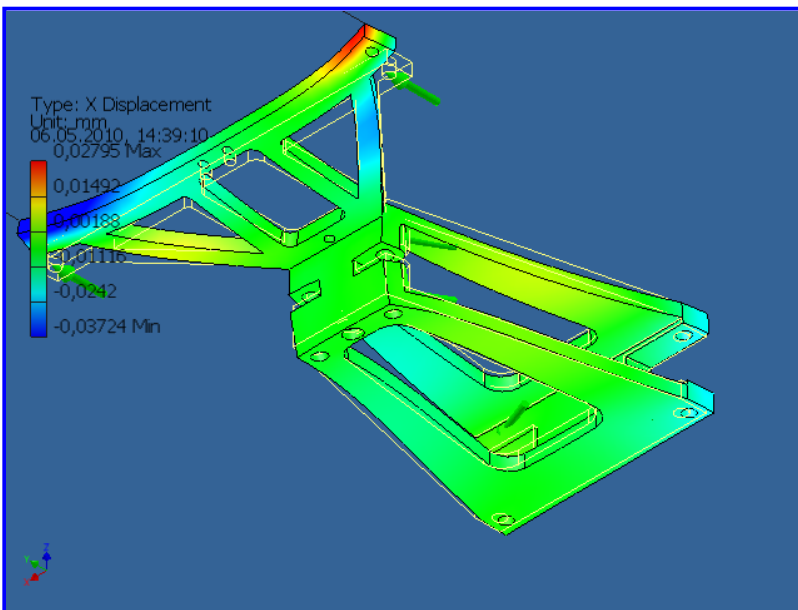
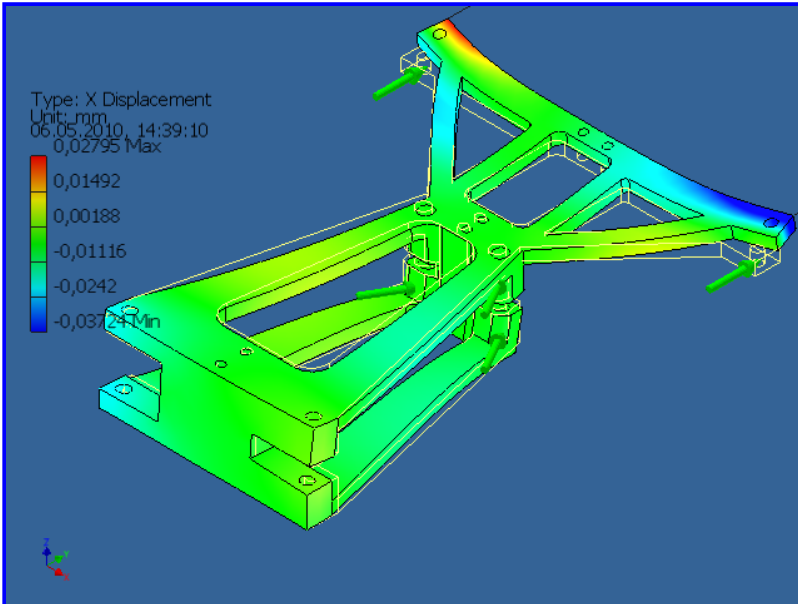


☐ Stress ZZ

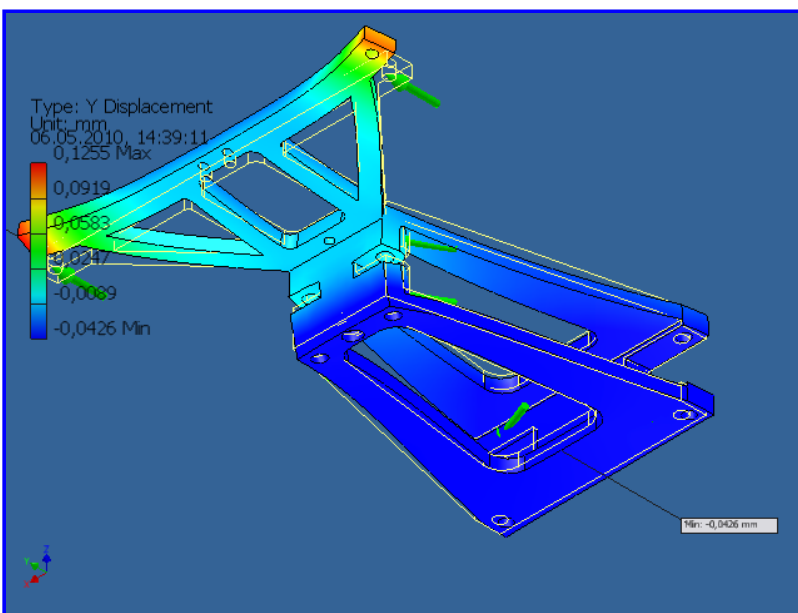
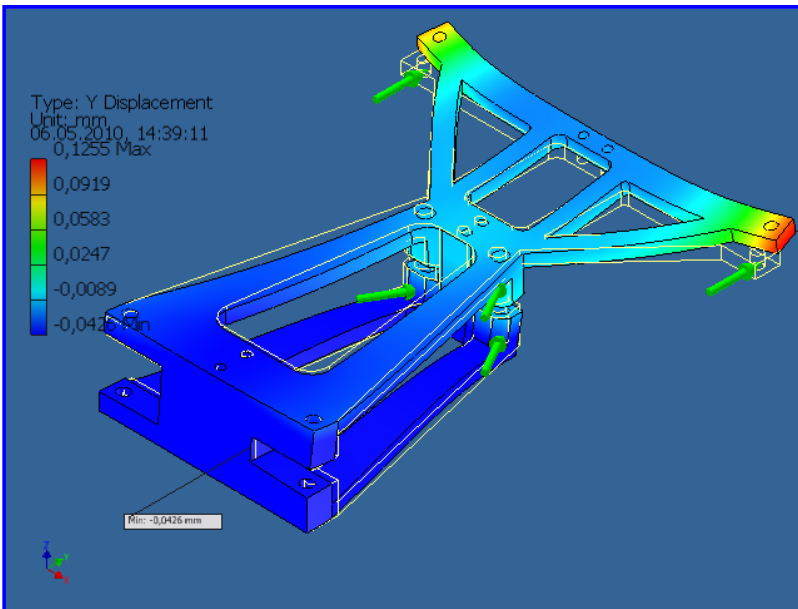




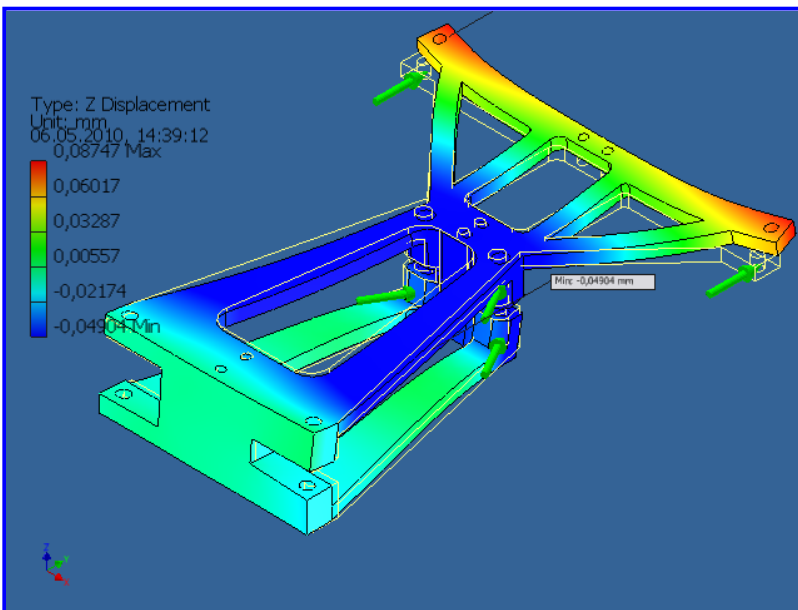
X Displacement



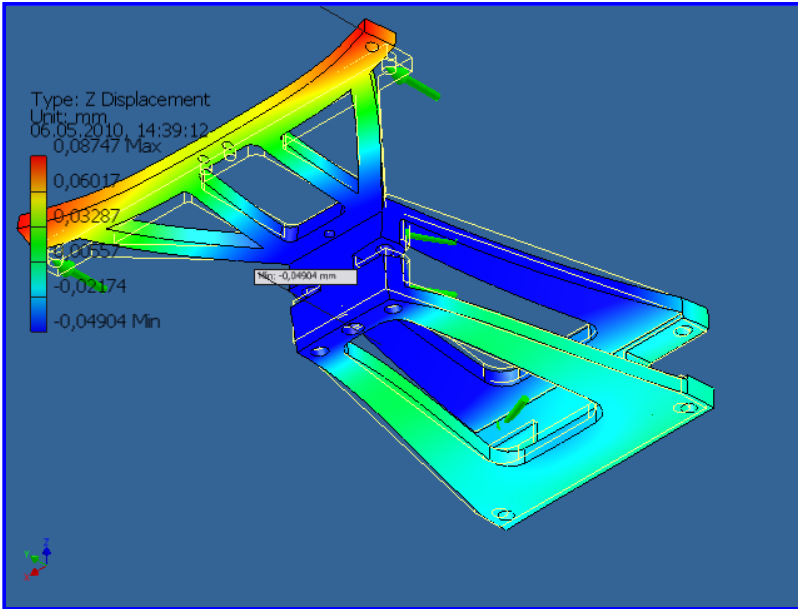
Y Displacement



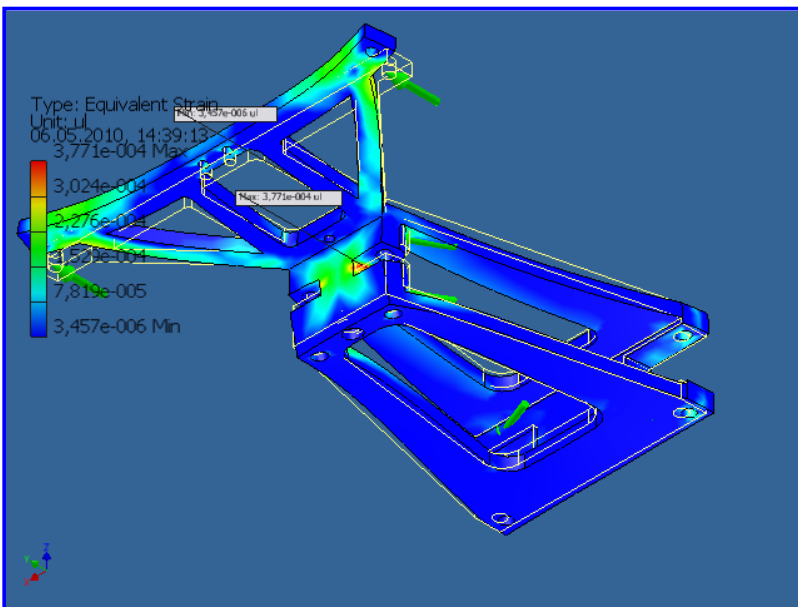
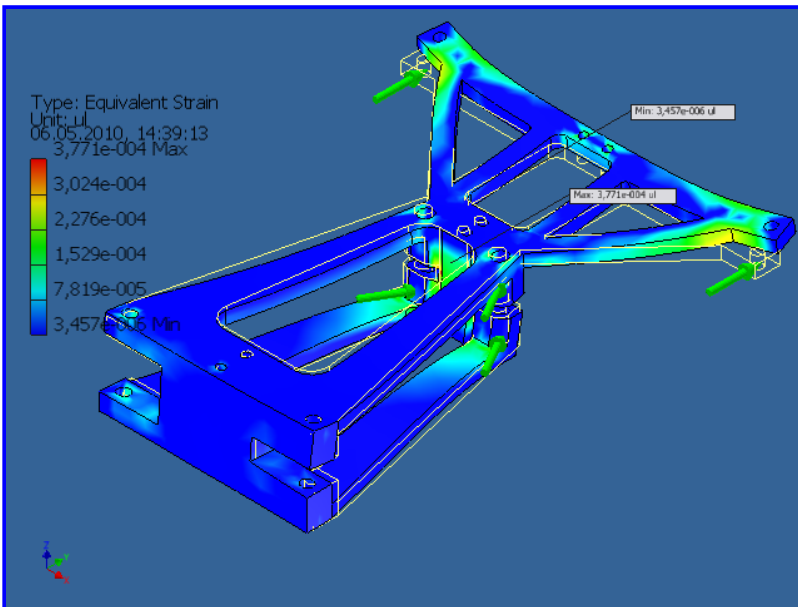
**Z Displacement**



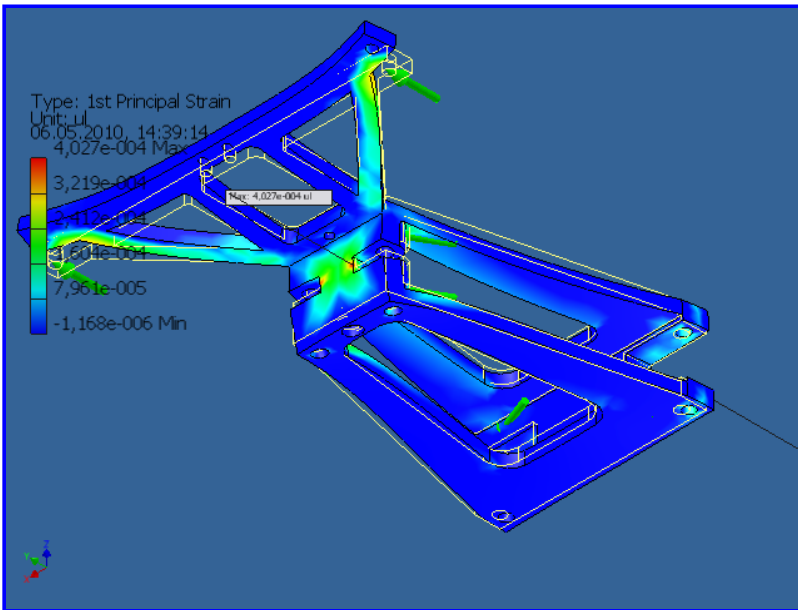
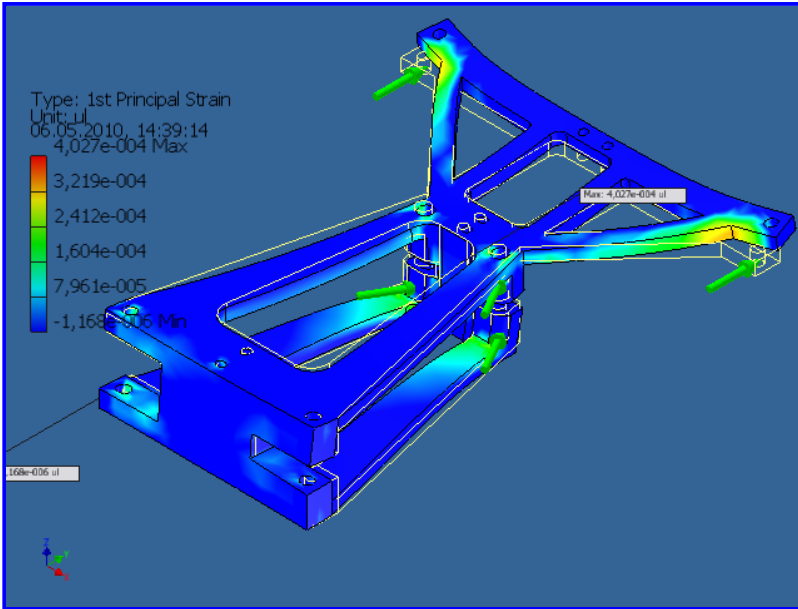




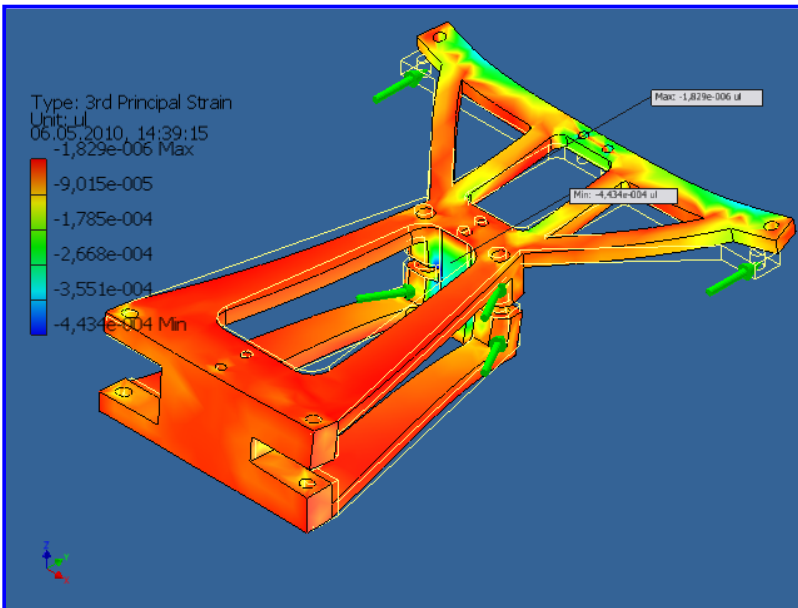
Equivalent Strain

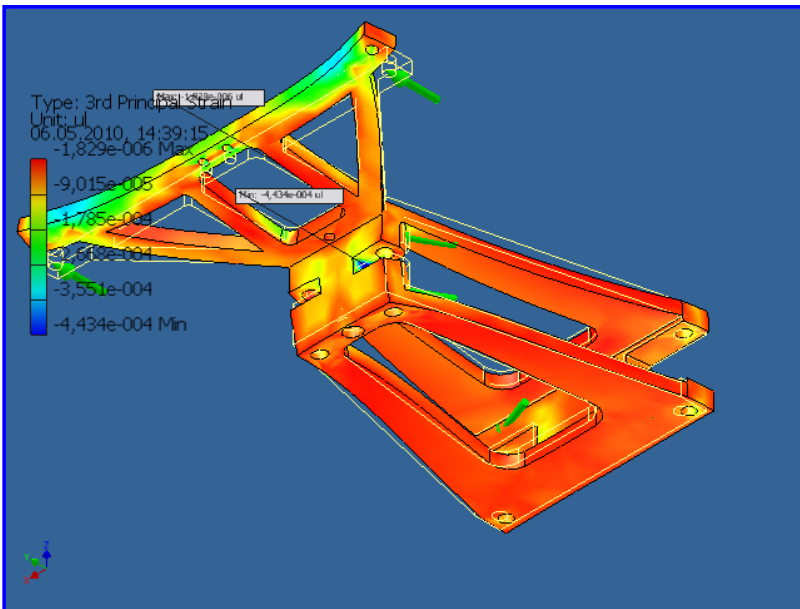


1st Principal Strain

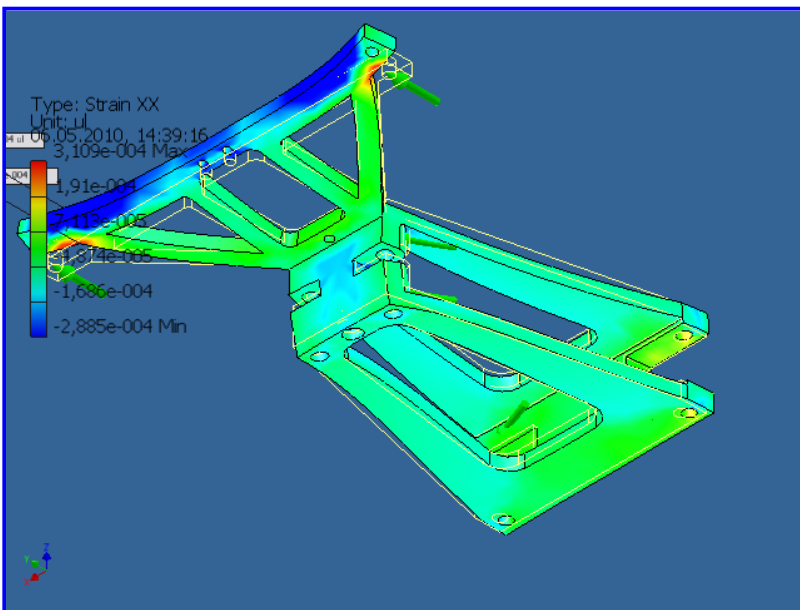
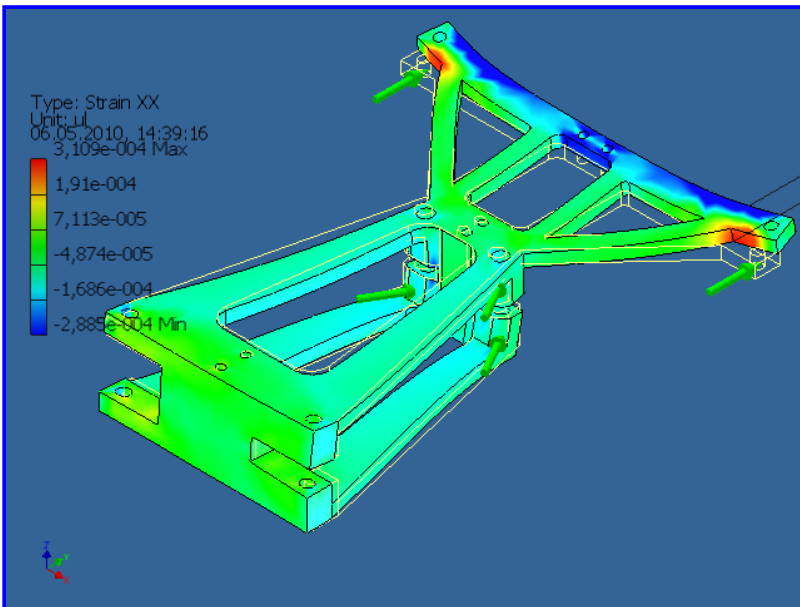


3rd Principal Strain

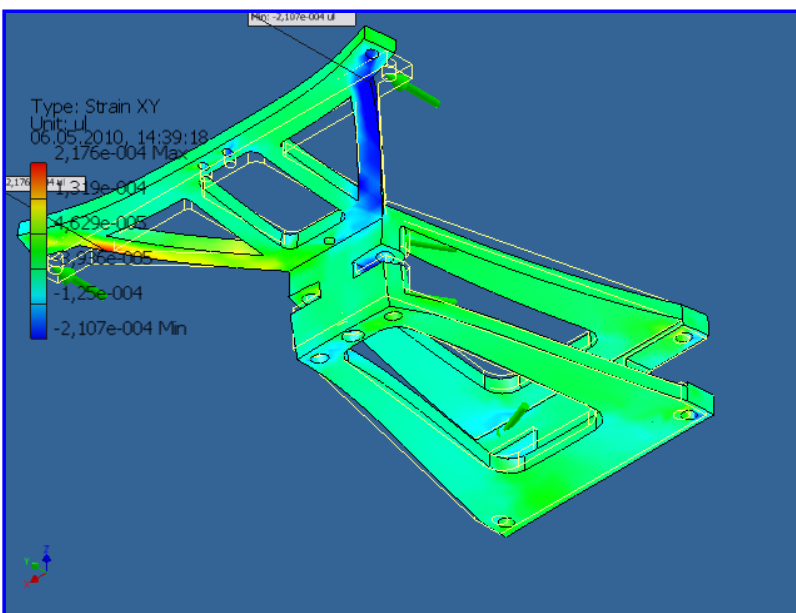
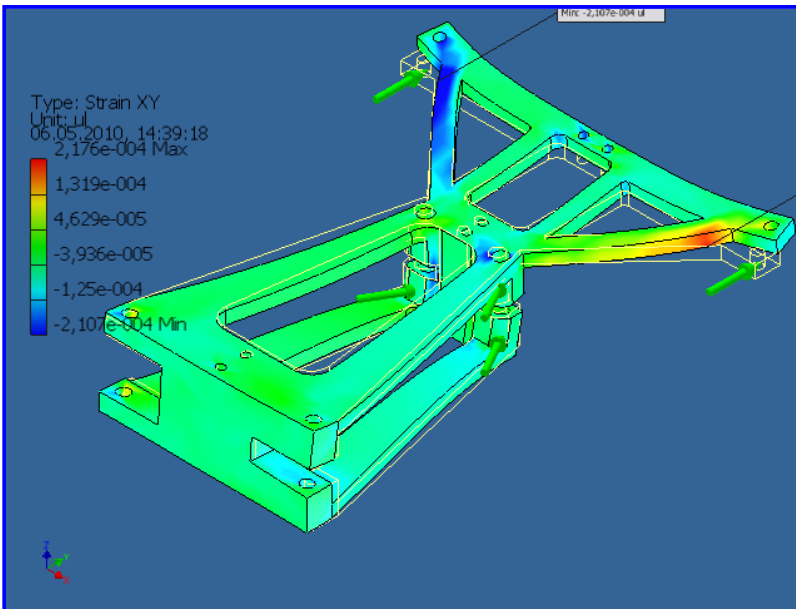




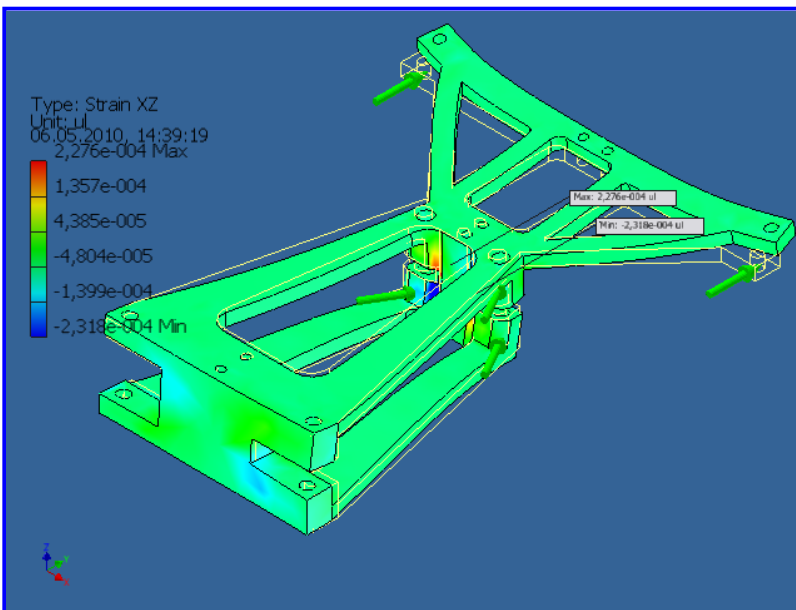
☐ Strain XX

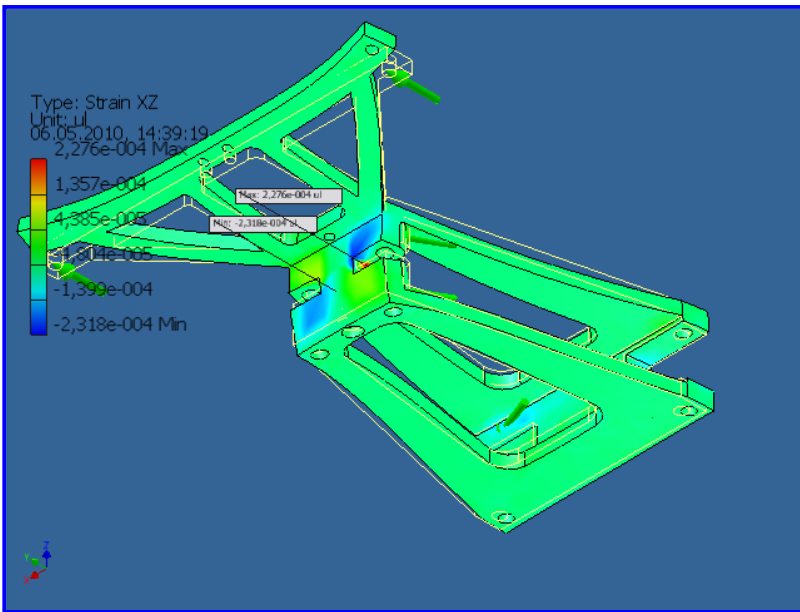


☐ Strain XY

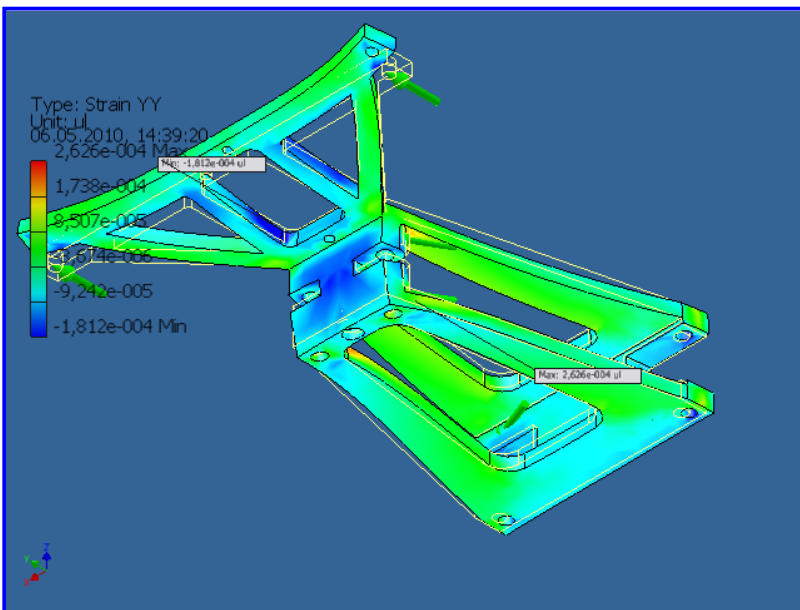
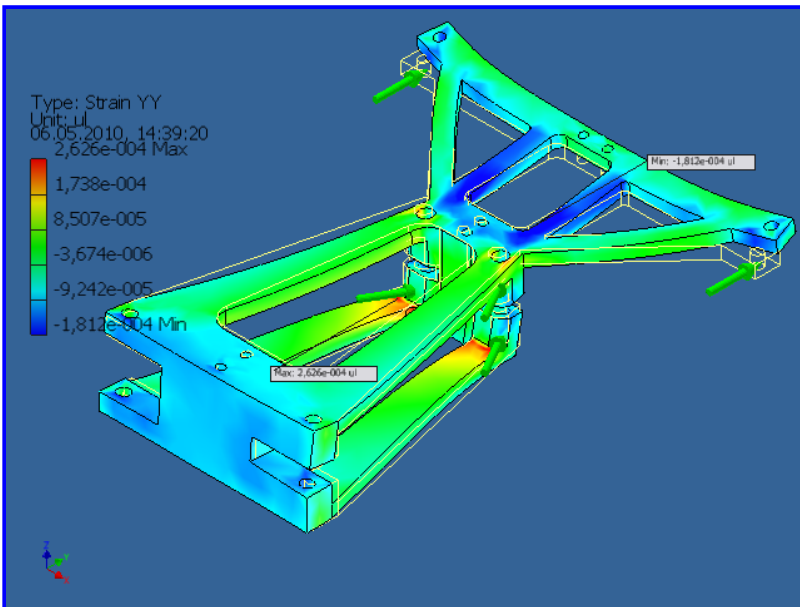


☐ Strain XZ

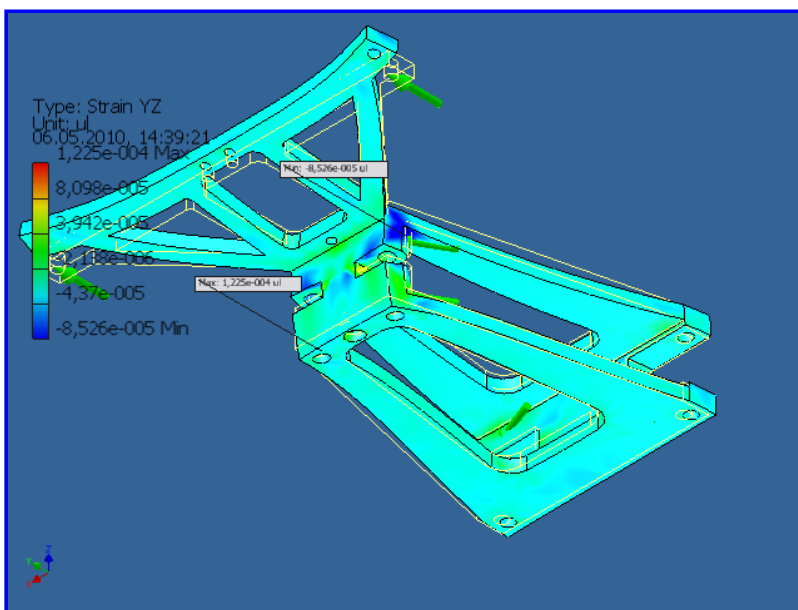
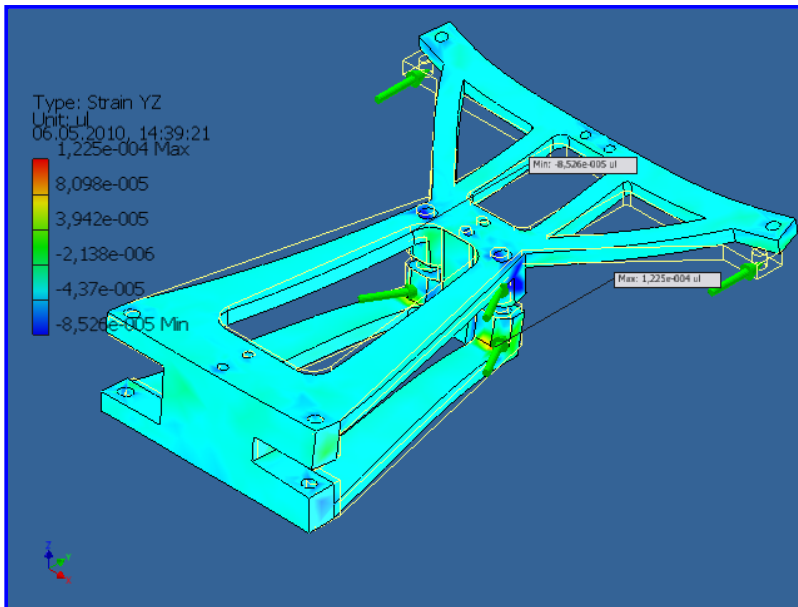




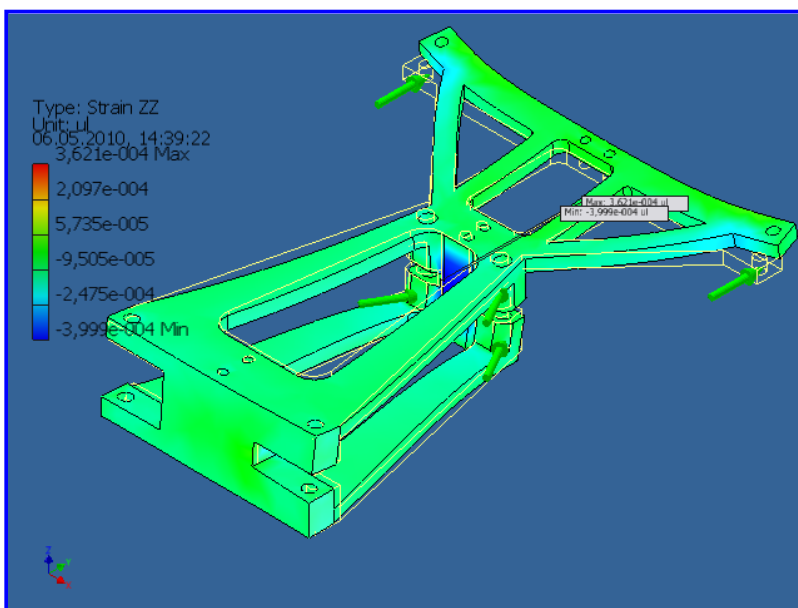
Strain YY

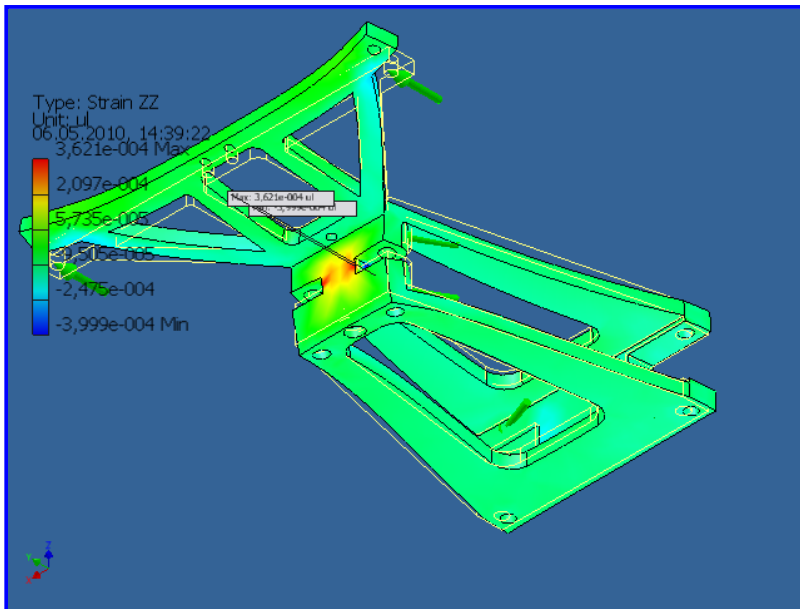


Strain YZ



### Strain ZZ





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