

## 20mm MgO MA Floor 3.0kPa 1.8kN 1800mm

# Autodesk®

Analyzed File:	20mm MgO Floor 1800 600.ipt
Autodesk Inventor Version:	2012 (Build 160160000, 160)
Creation Date:	27/06/2013, 10:45
Simulation Author:	Petei7Ivy
Summary:	

### ☐ Project Info (iProperties)

#### ☐ Summary

Author	Petei7Ivy
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#### ☐ Project

Part Number	20mm MgO Floor 1800 600
Designer	Petei7Ivy
Cost	£0.00
Date Created	26/06/2013

#### ☐ Status

Design Status	WorkInProgress
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#### ☐ Physical

Material	Default
Density	1 g/cm <sup>3</sup>
Mass	21.89 kg
Area	2282800 mm <sup>2</sup>
Volume	21890000 mm <sup>3</sup>
Center of Gravity	x=899.945 mm y=300 mm z=10.1085 mm

Note: Physical values could be different from Physical values used by FEA reported below.

### ☐ 20mm MgO Corp MA Floor 3.0kPa 1.8kN 1800 600 Load Analysis

#### General objective and settings:

Design Objective	Single Point
Simulation Type	Static Analysis
Last Modification Date	27/06/2013, 10:42
Detect and Eliminate Rigid Body Modes	No

#### Advanced settings:

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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

### Material(s)

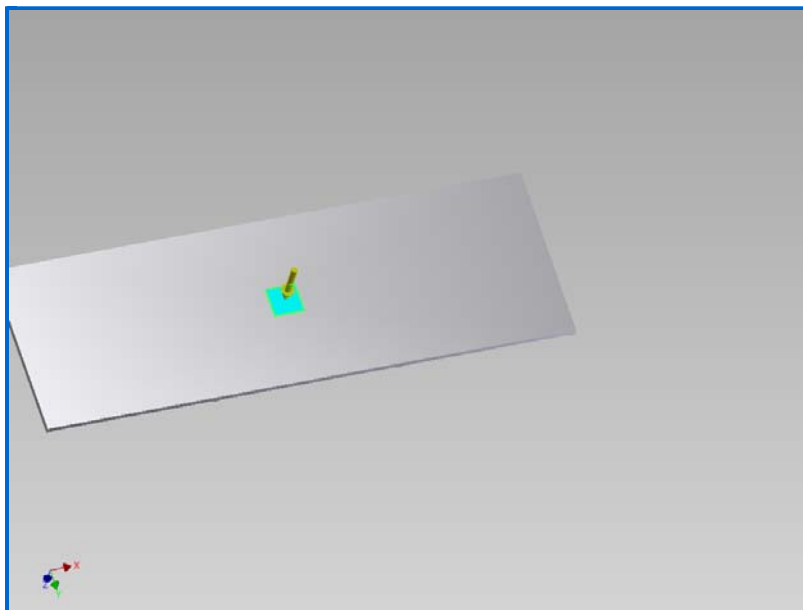
Name	MgO MA 20mm	
General	Mass Density	0.93 g/cm <sup>3</sup>
	Yield Strength	8.1 MPa
	Ultimate Tensile Strength	8.1 MPa
Stress	Young's Modulus	5.56 GPa
	Poisson's Ratio	0.35 ul
	Shear Modulus	2.05926 GPa
Stress Thermal	Expansion Coefficient	0 ul/c
	Thermal Conductivity	0 W/( m K )
	Specific Heat	0 J/( kg c )
Part Name(s)	20mm MgO Floor 1800 600	

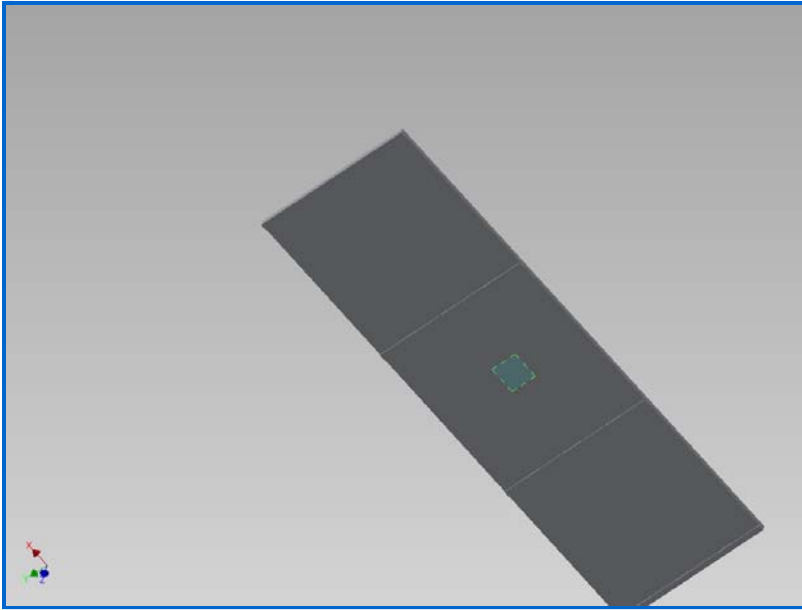
### Operating conditions

#### Force:1

Load Type	Force
Magnitude	1800.000 N
Vector X	0.000 N
Vector Y	0.000 N
Vector Z	1800.000 N

#### Selected Face(s)

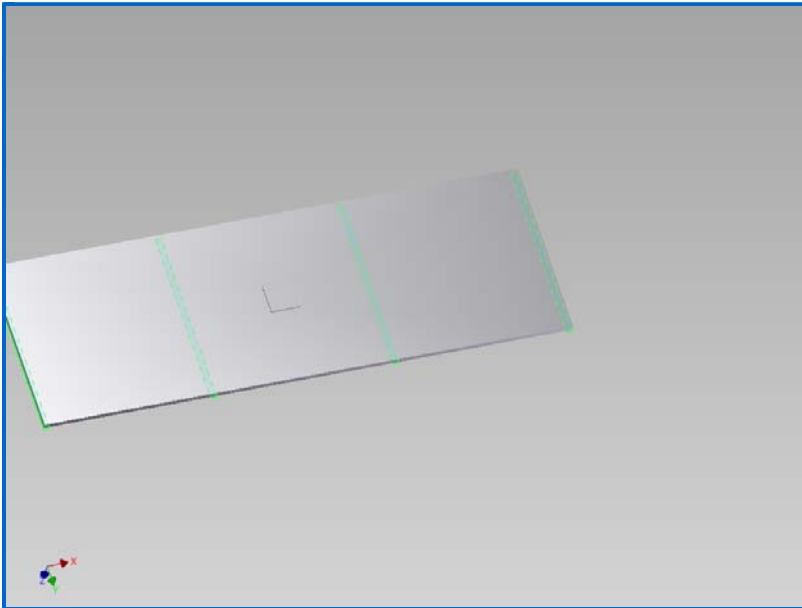


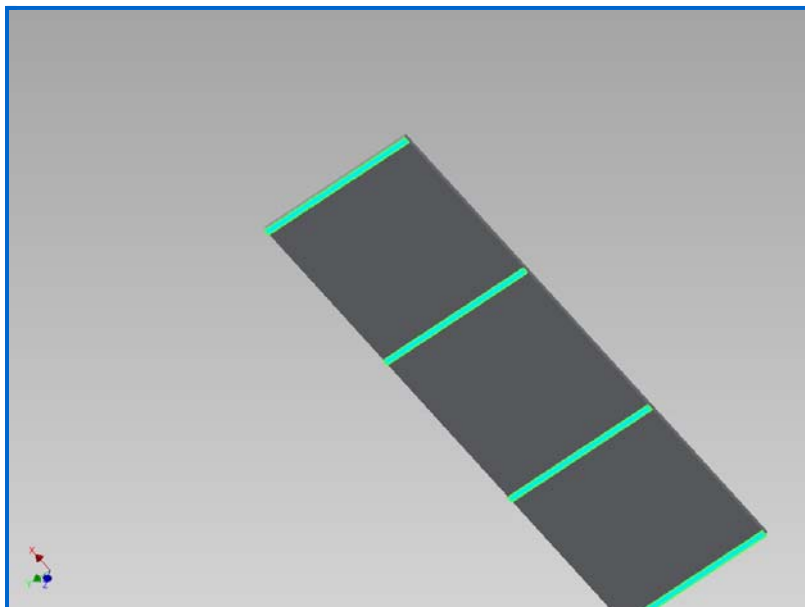


Fixed Constraint: 1

Constraint Type Fixed Constraint

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)
Fixed Constraint:1	1800 N	0 N	9.0261 N m	0 N m
		0 N		9.0261 N m
		-1800 N		0 N m

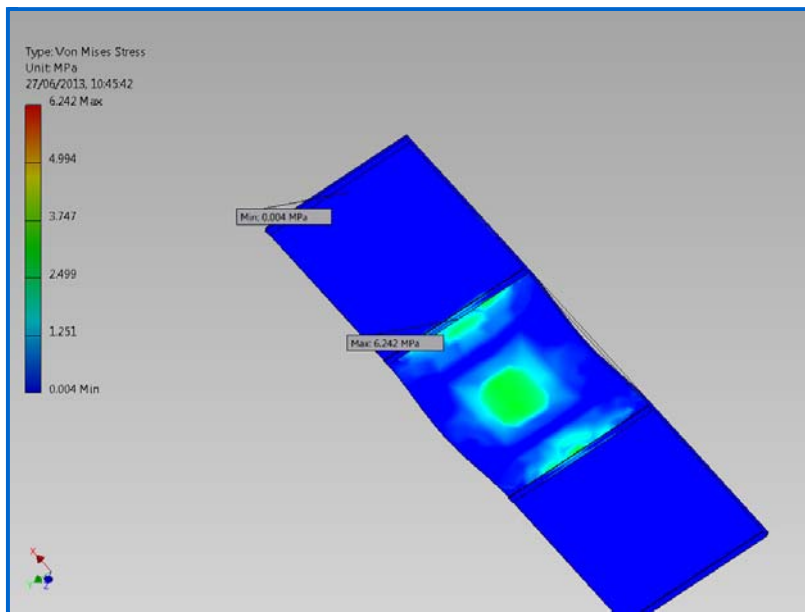
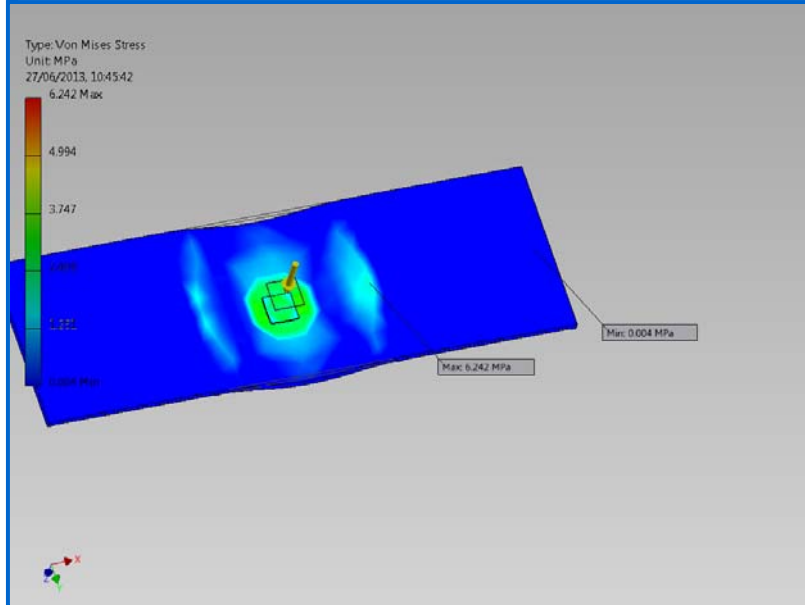
**Result Summary**

Name	Minimum	Maximum
Volume	21890000 mm <sup>3</sup>	
Mass	20.3577 kg	
Von Mises Stress	0.00376048 MPa	6.24201 MPa
1st Principal Stress	-2.73927 MPa	4.5707 MPa
3rd Principal Stress	-8.0249 MPa	1.4891 MPa
Displacement	0 mm	1.03846 mm
Safety Factor	1.29766 ul	15 ul
Stress XX	-4.58136 MPa	4.00279 MPa
Stress XY	-0.538121 MPa	0.545211 MPa
Stress XZ	-2.5098 MPa	2.58448 MPa
Stress YY	-3.47246 MPa	3.174 MPa
Stress YZ	-1.23029 MPa	0.883513 MPa
Stress ZZ	-7.00797 MPa	4.26813 MPa
X Displacement	-0.0535019 mm	0.0522461 mm
Y Displacement	-0.0280187 mm	0.0279006 mm
Z Displacement	-0.017975 mm	1.03846 mm
Equivalent Strain	0.000000637461 ul	0.00105504 ul
1st Principal Strain	-0.00000283023 ul	0.000647249 ul
3rd Principal Strain	-0.0011777 ul	-0.000000467979 ul
Strain XX	-0.000652122 ul	0.000515846 ul
Strain XY	-0.000130659 ul	0.00013238 ul
Strain XZ	-0.000609394 ul	0.000627526 ul

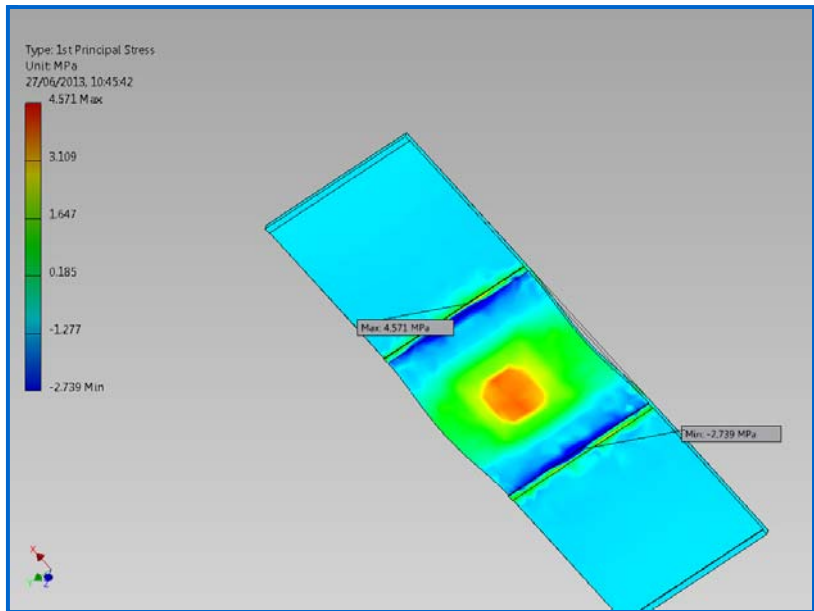
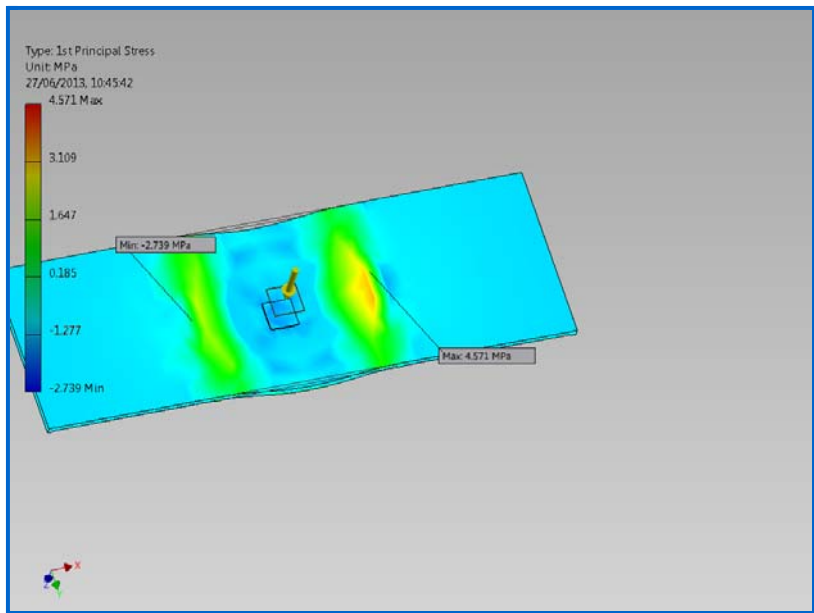
Strain YY	-0.000344092 ul	0.000314212 ul
Strain YZ	-0.00029872 ul	0.000214522 ul
Strain ZZ	-0.000950073 ul	0.000573783 ul

**Figures**

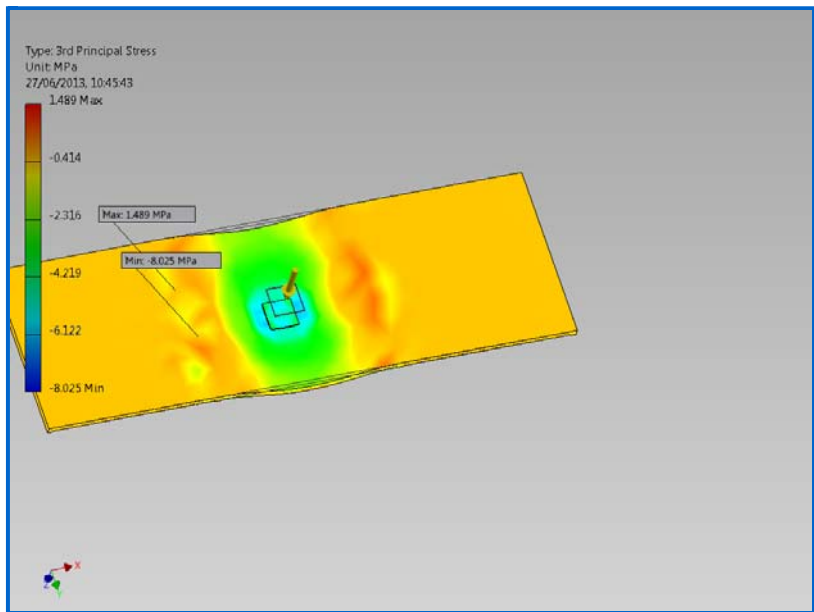
**Von Mises Stress**

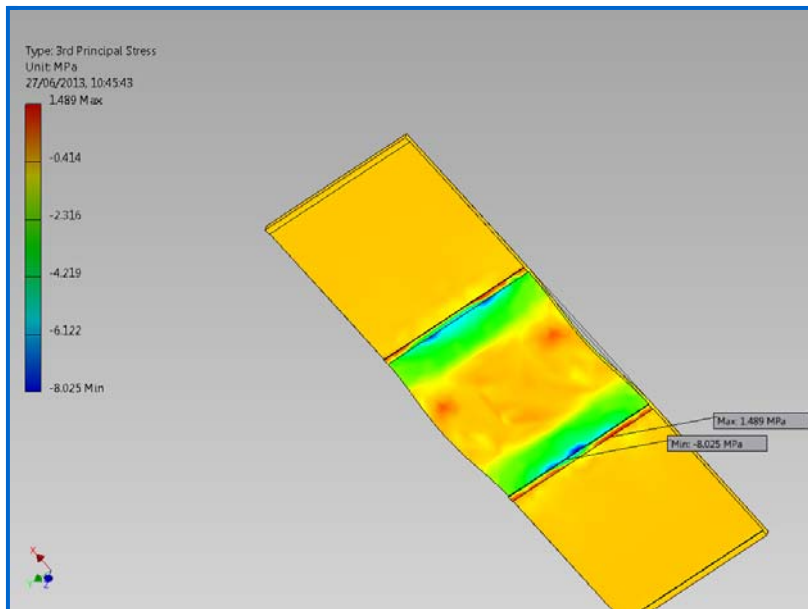


**1st Principal Stress**

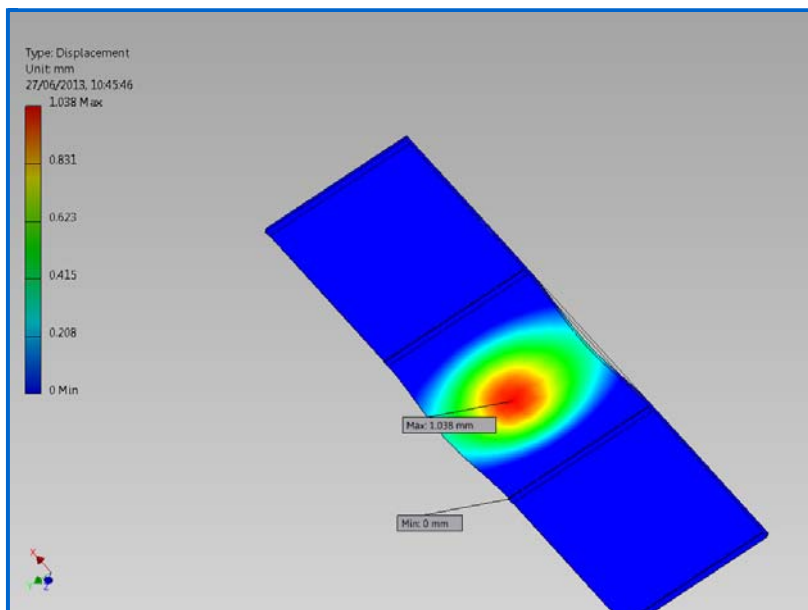
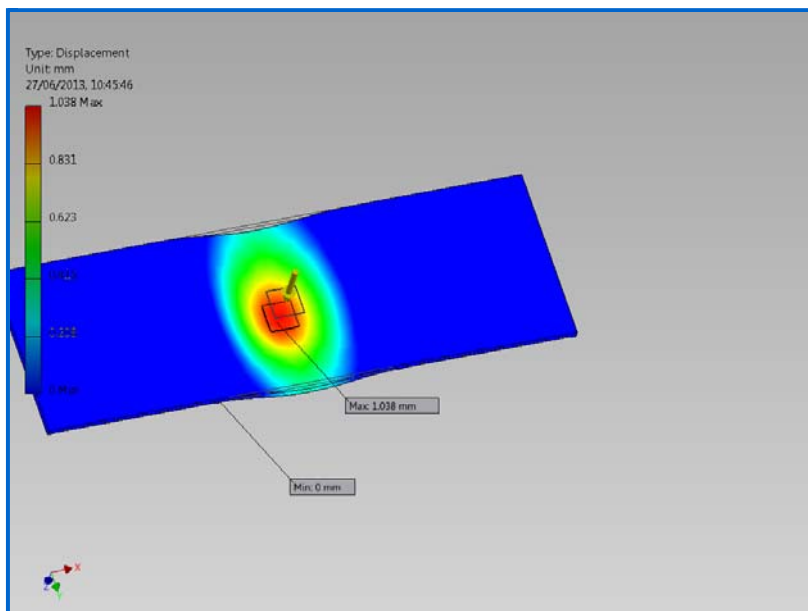


3rd Principal Stress

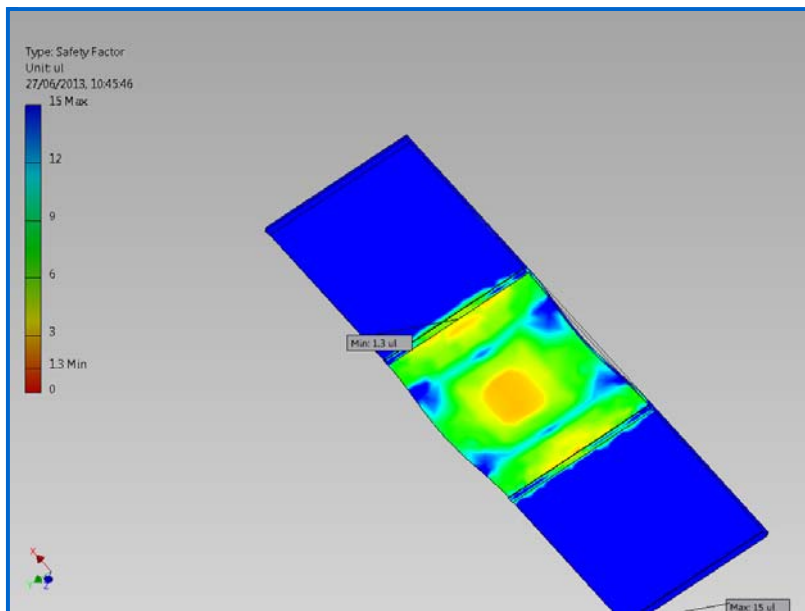
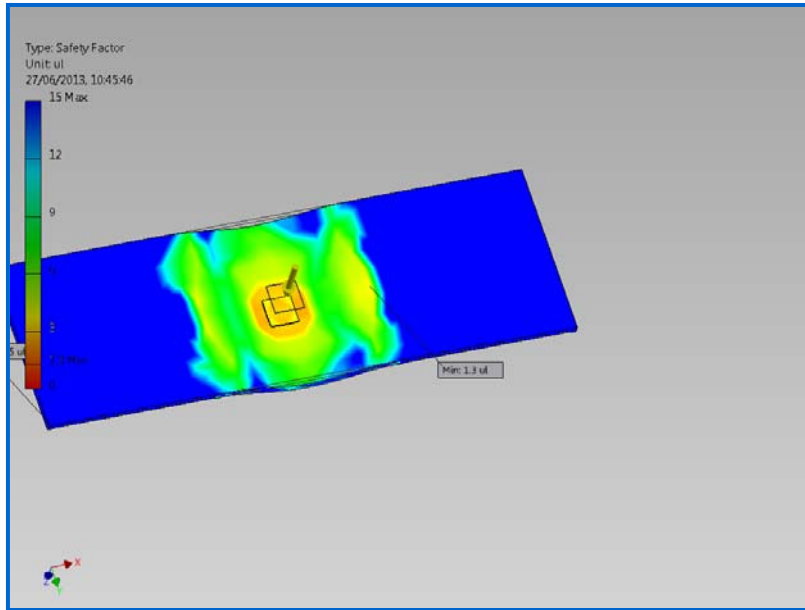




### Displacement

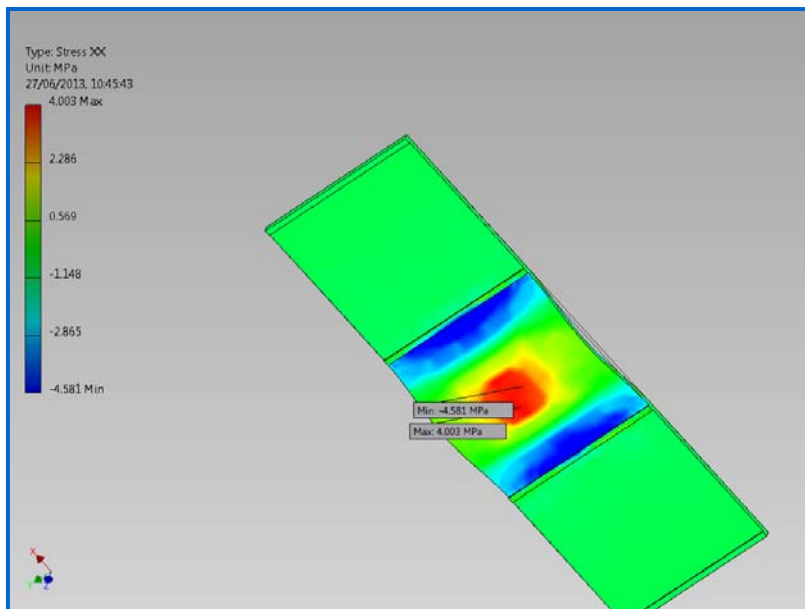
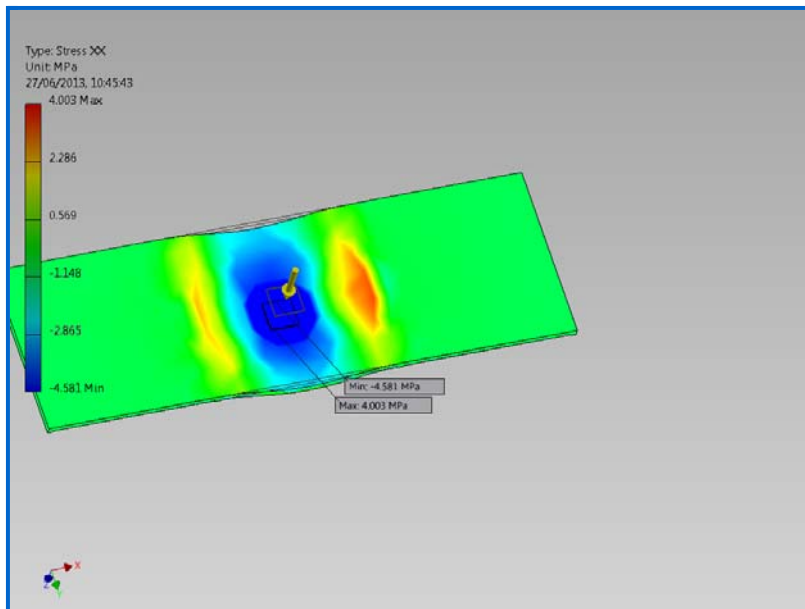


☐ Safety Factor

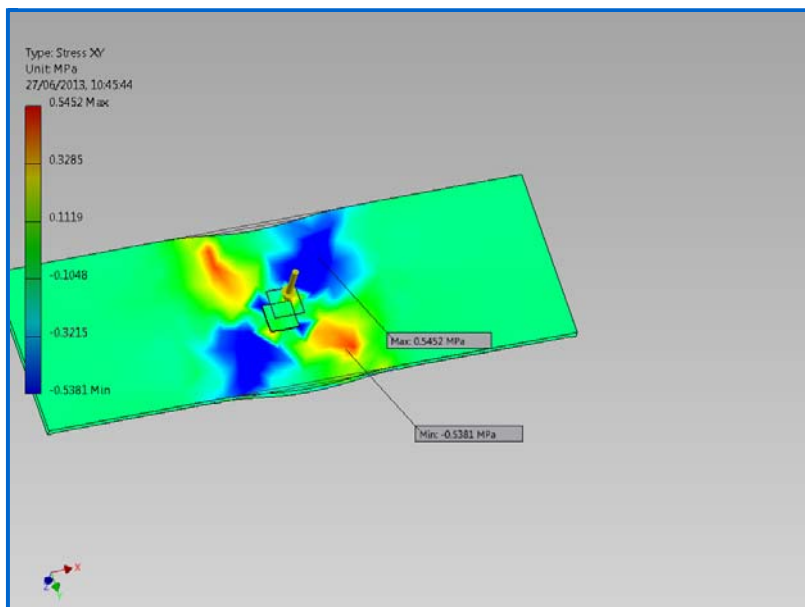


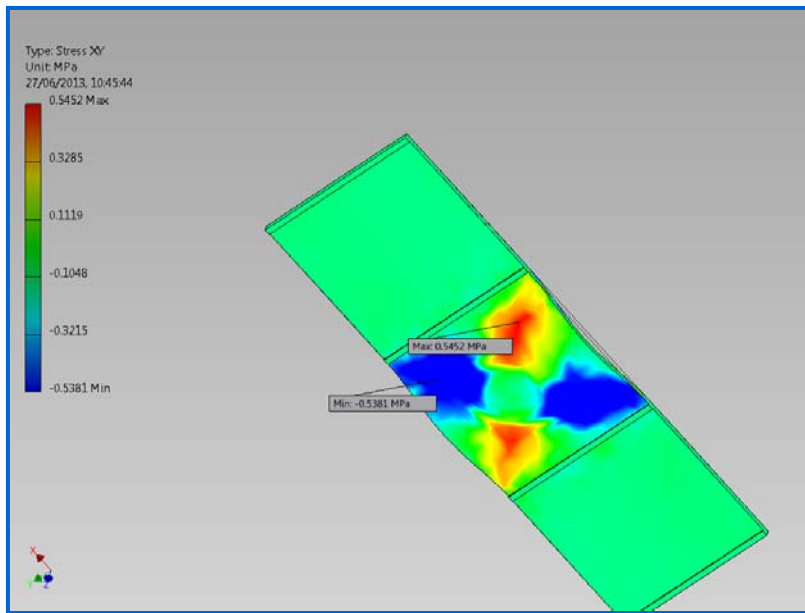
☐ Stress XX



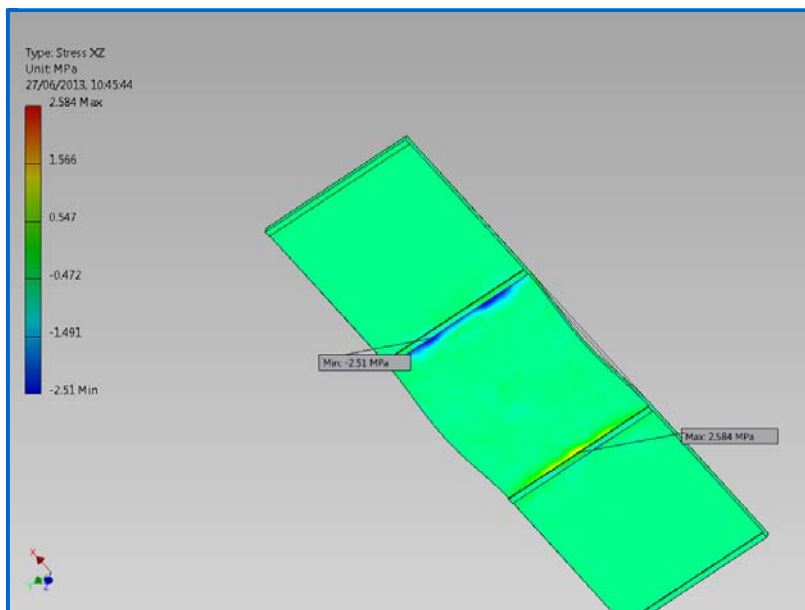
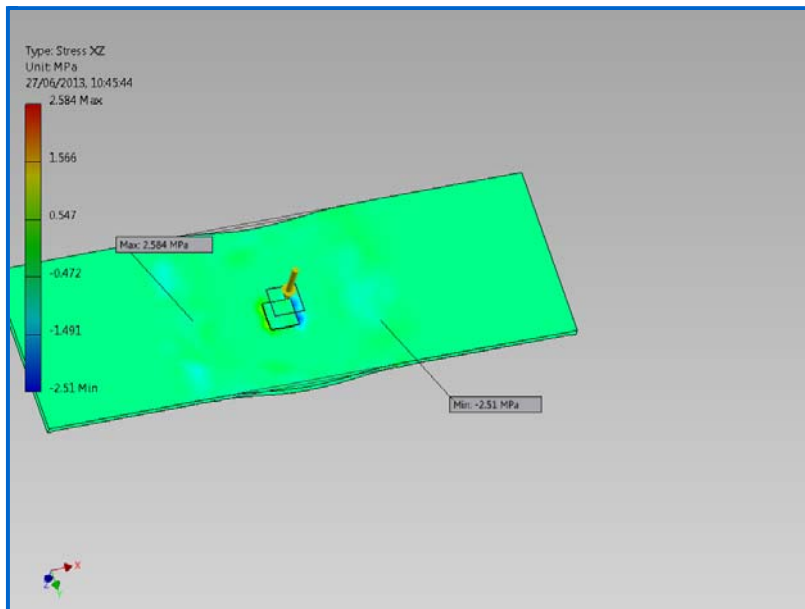


☐ Stress XY

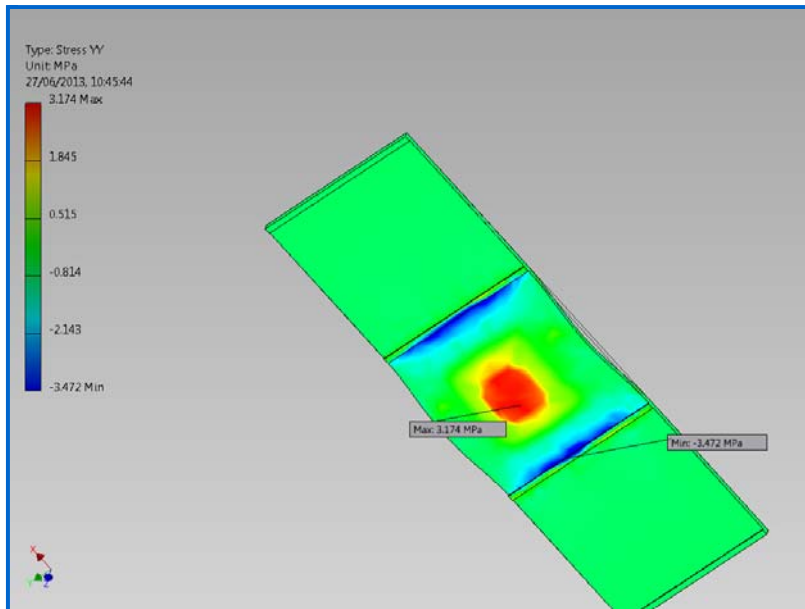
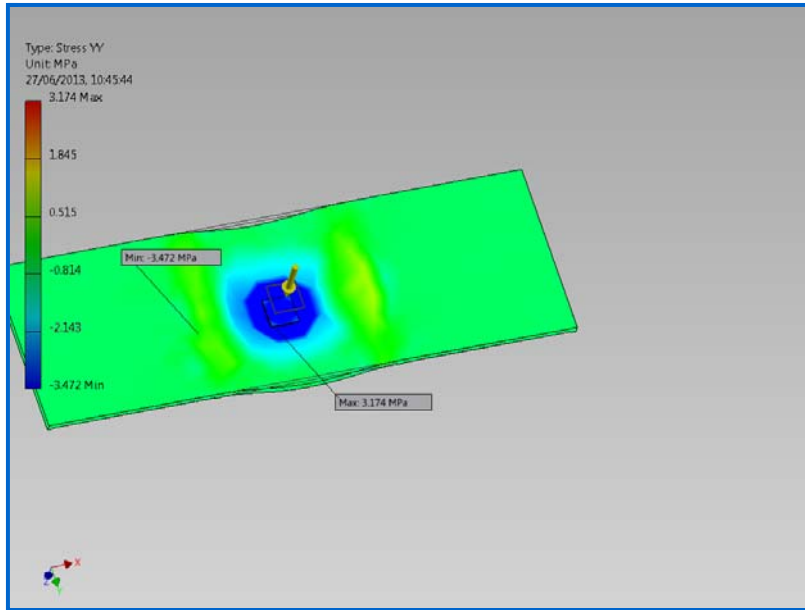




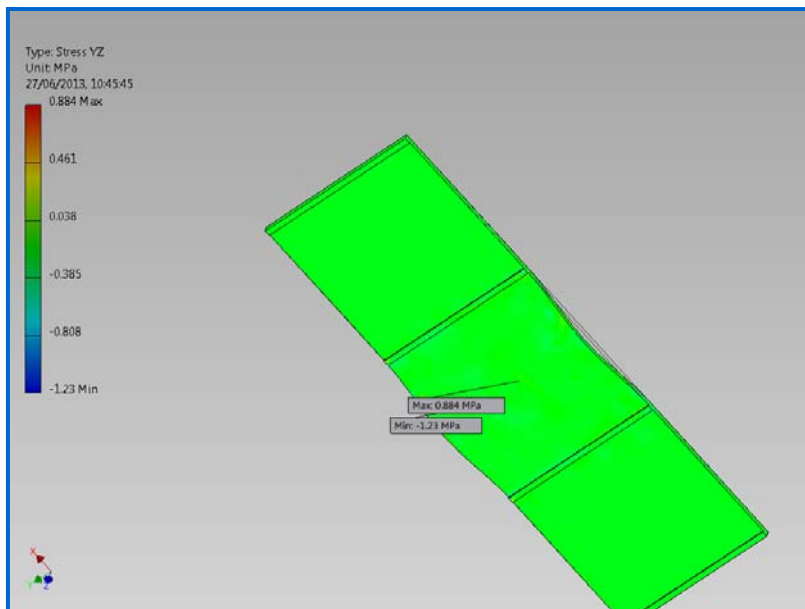
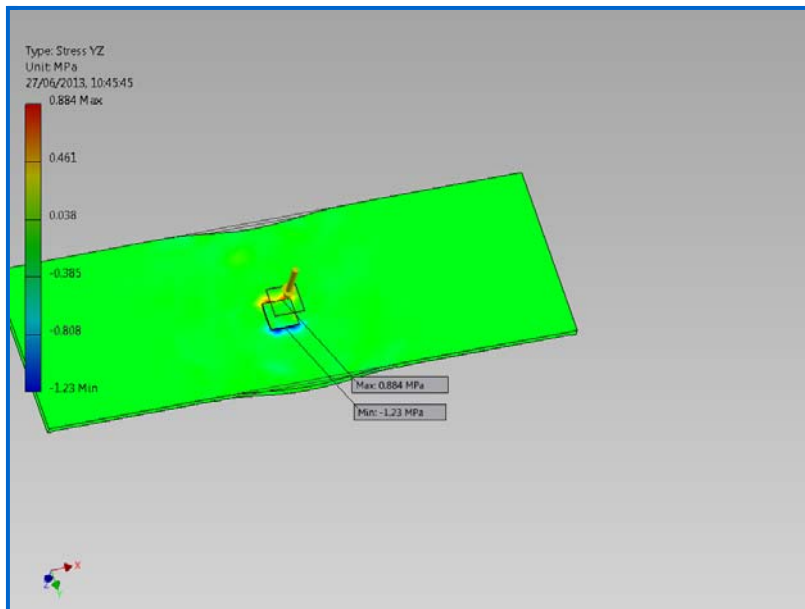
☐ Stress XZ



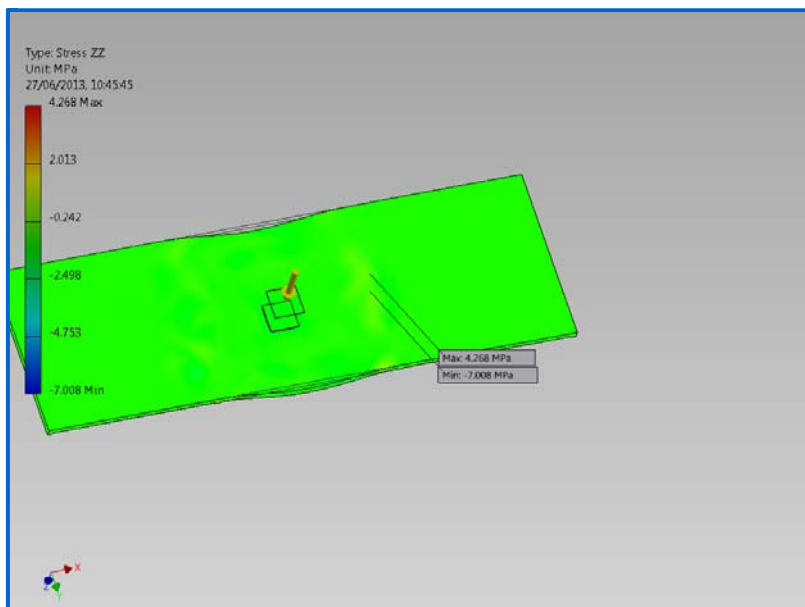
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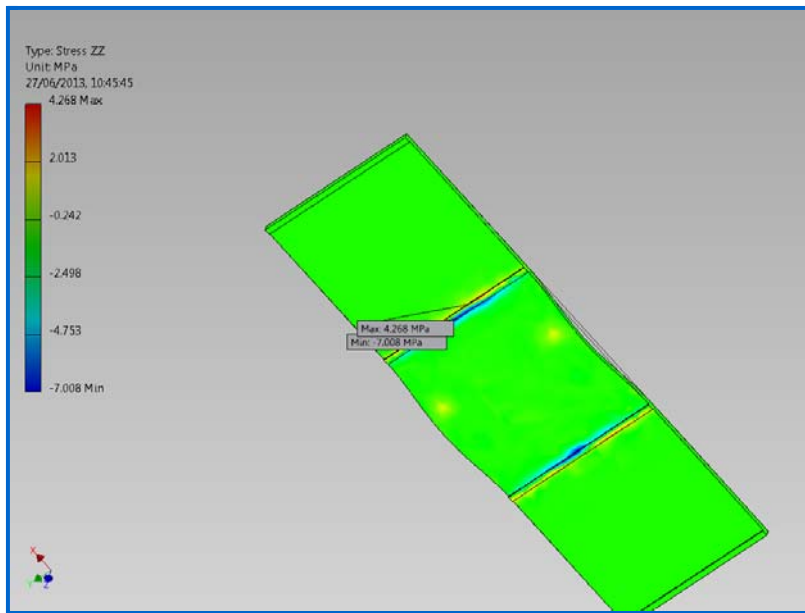


☐ Stress YZ

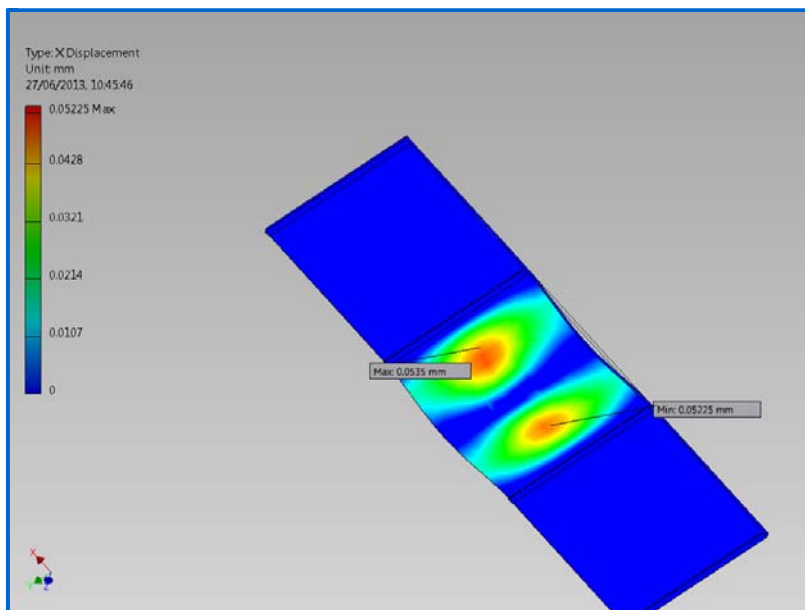
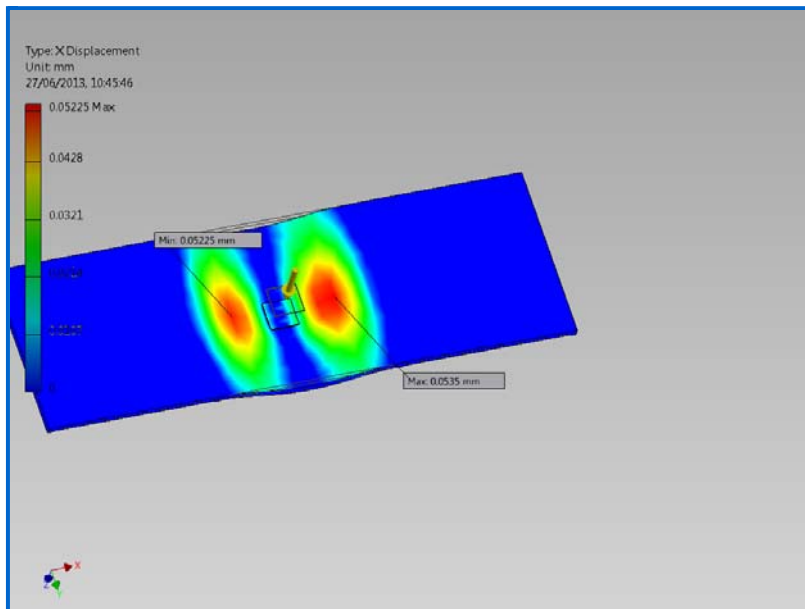


☐ Stress ZZ

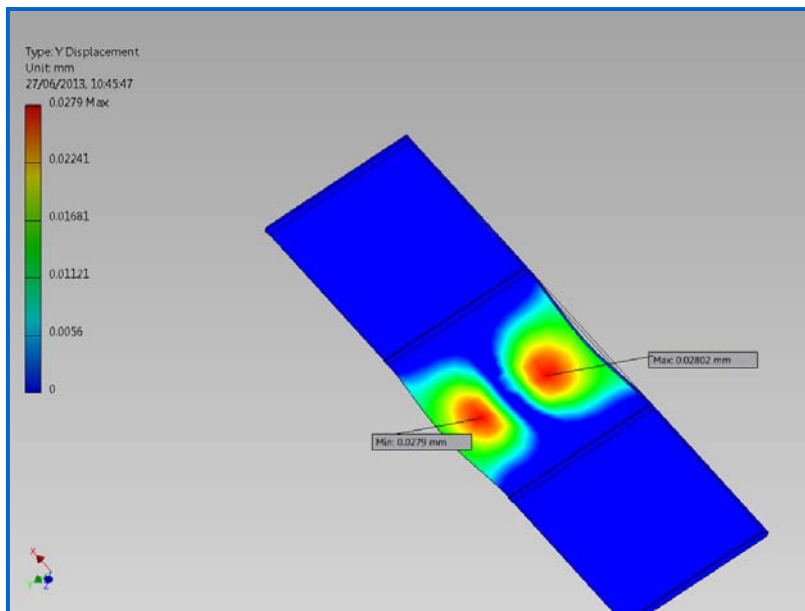
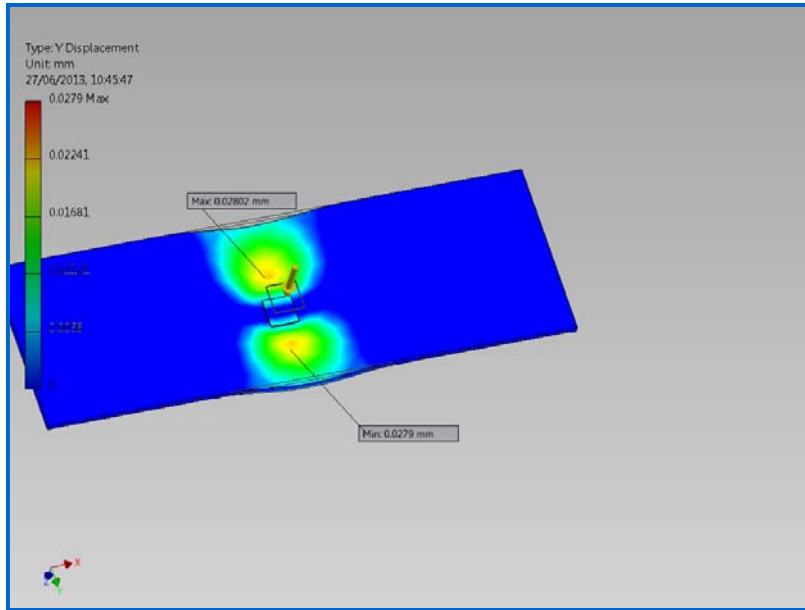




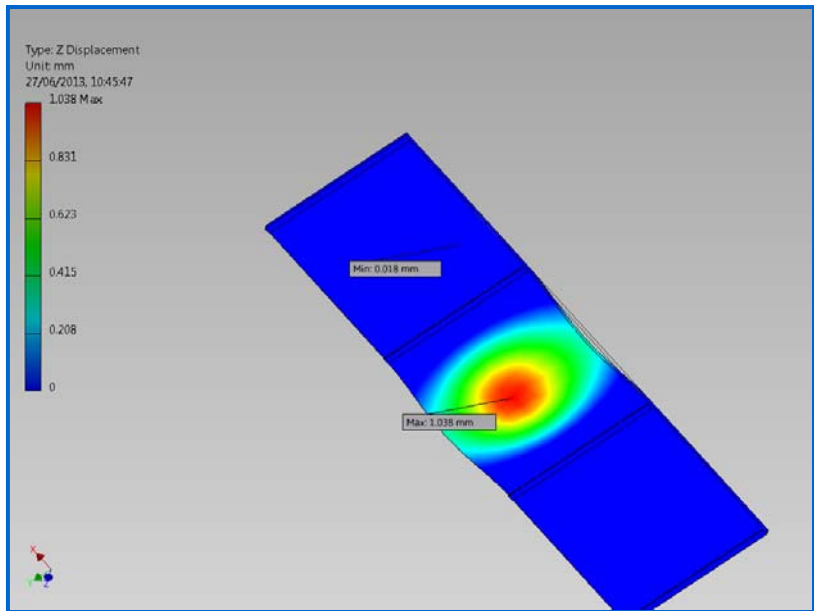
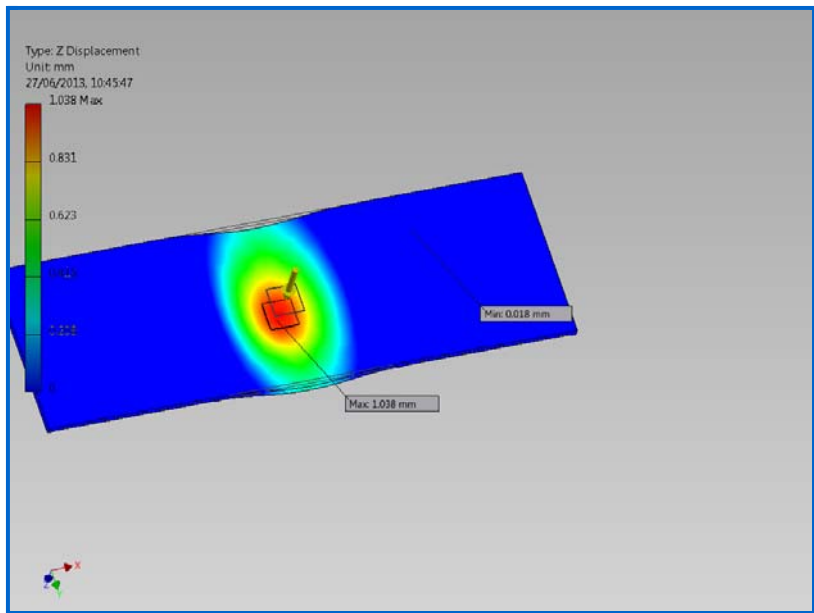
☐ X Displacement



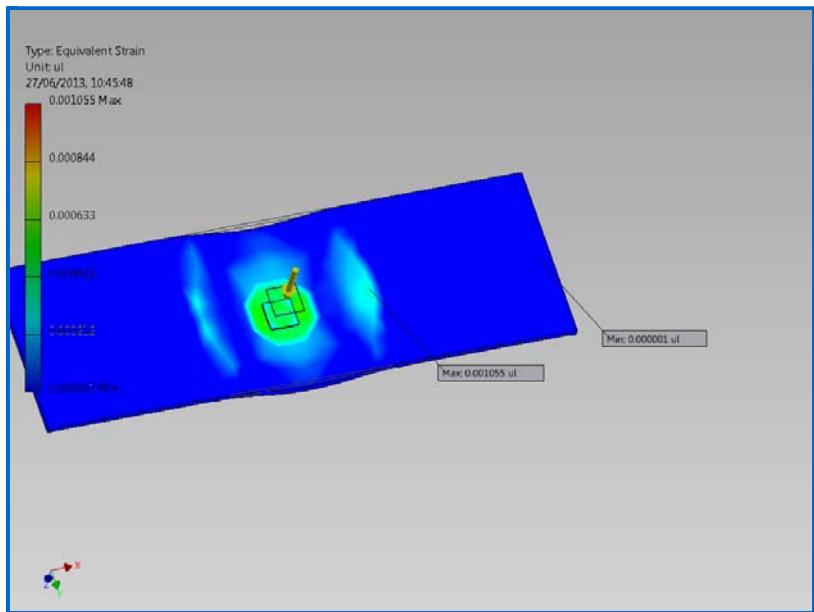
☐ Y Displacement

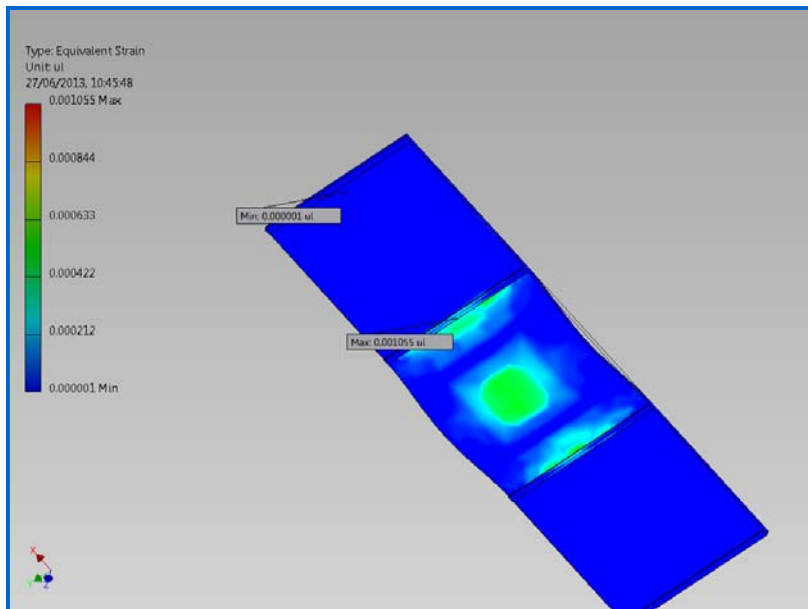


☐ Z Displacement

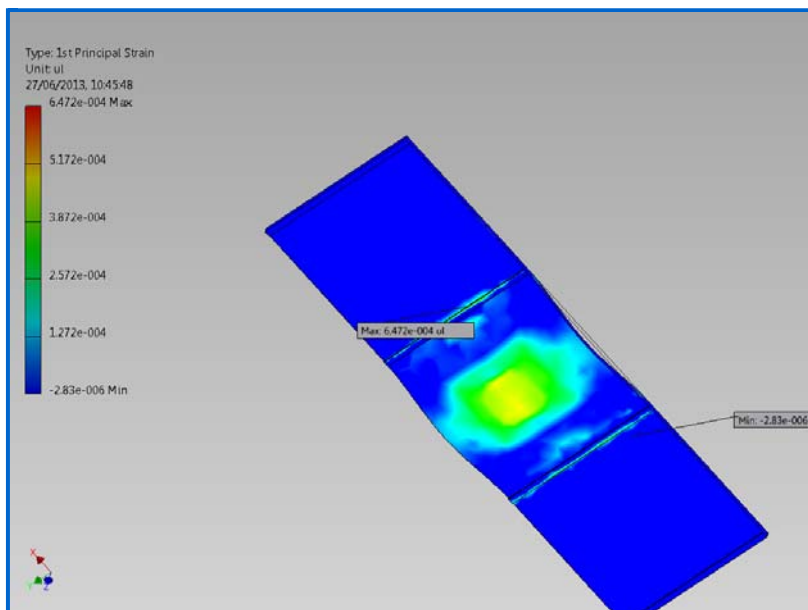
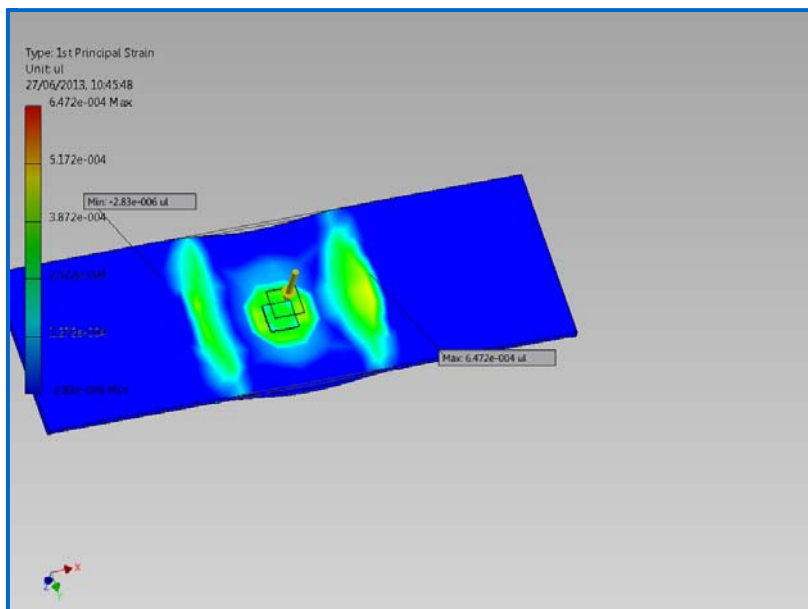


**Equivalent Strain**



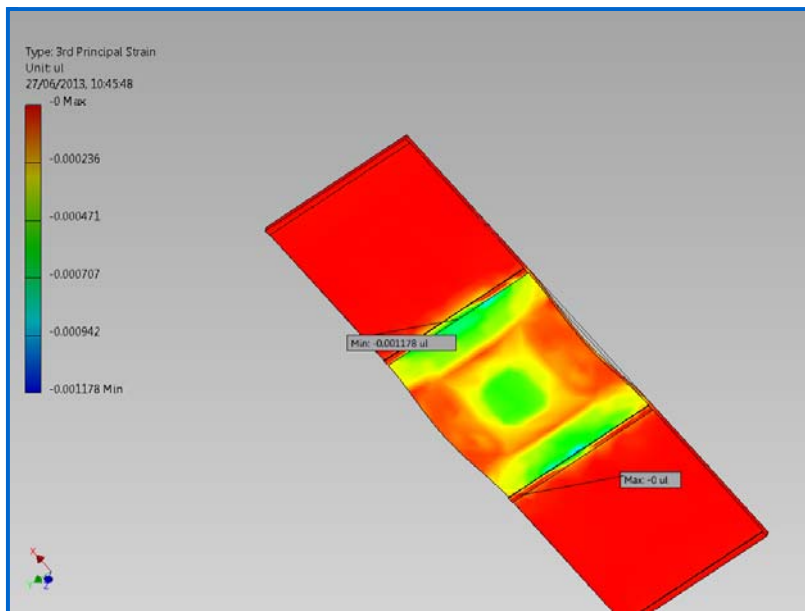
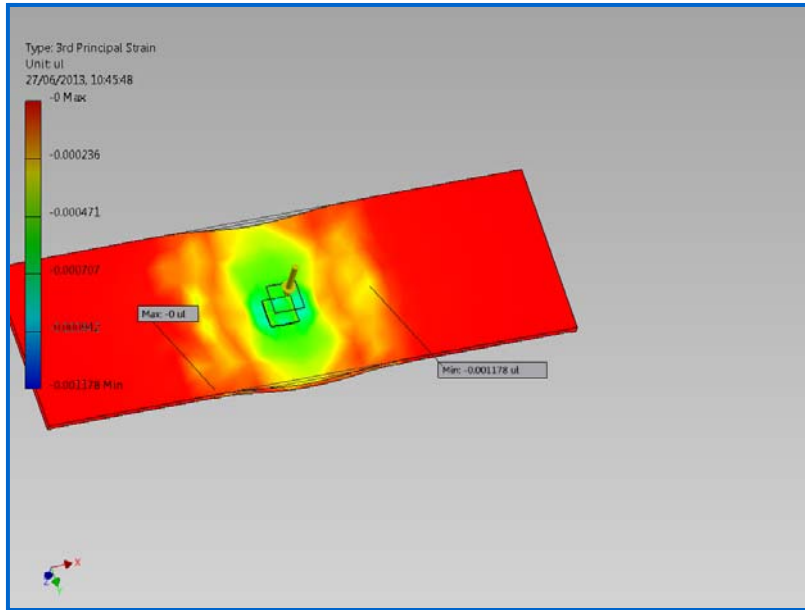


☐ 1st Principal Strain

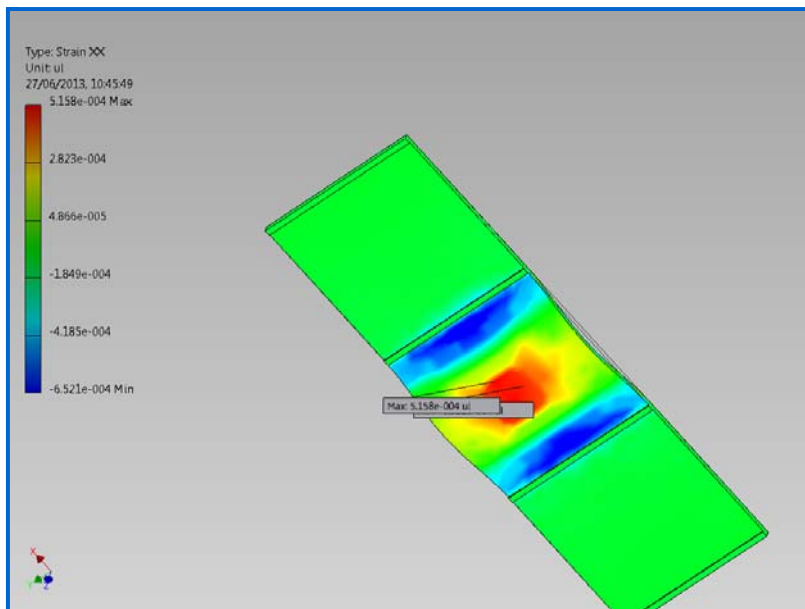
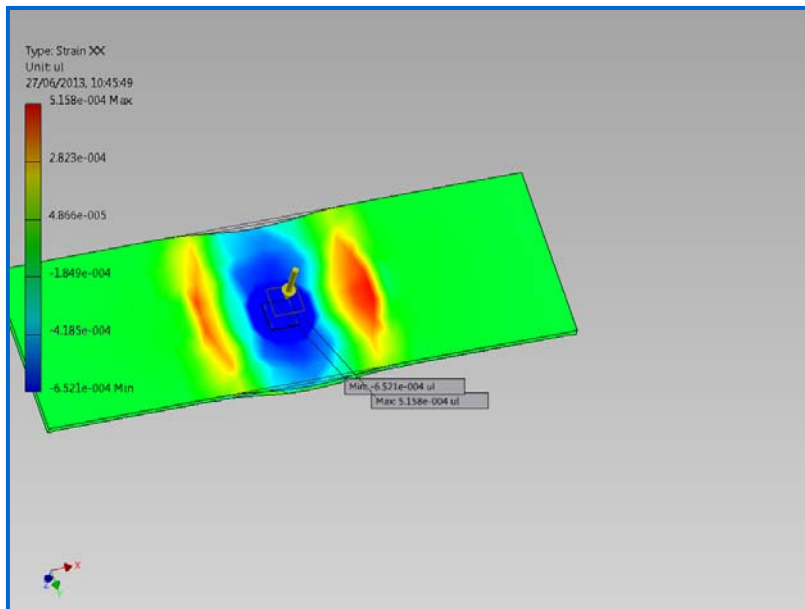




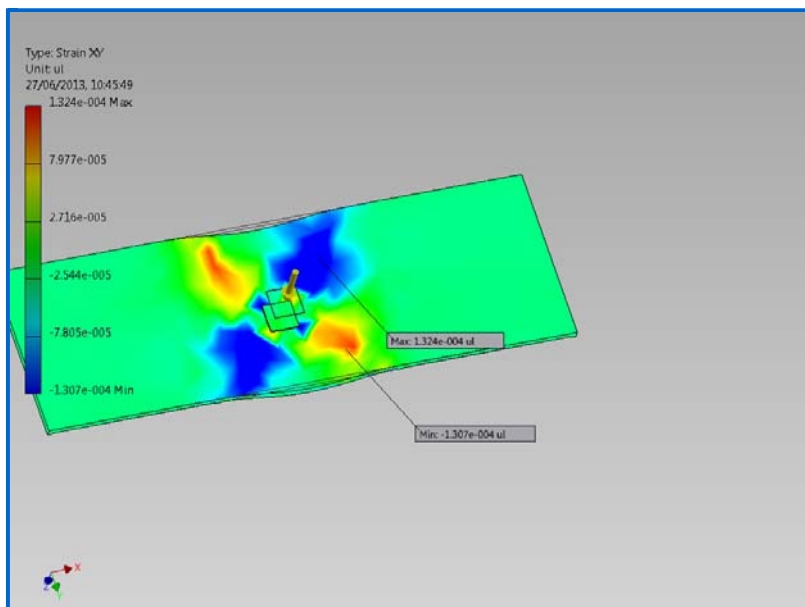
### 3rd Principal Strain

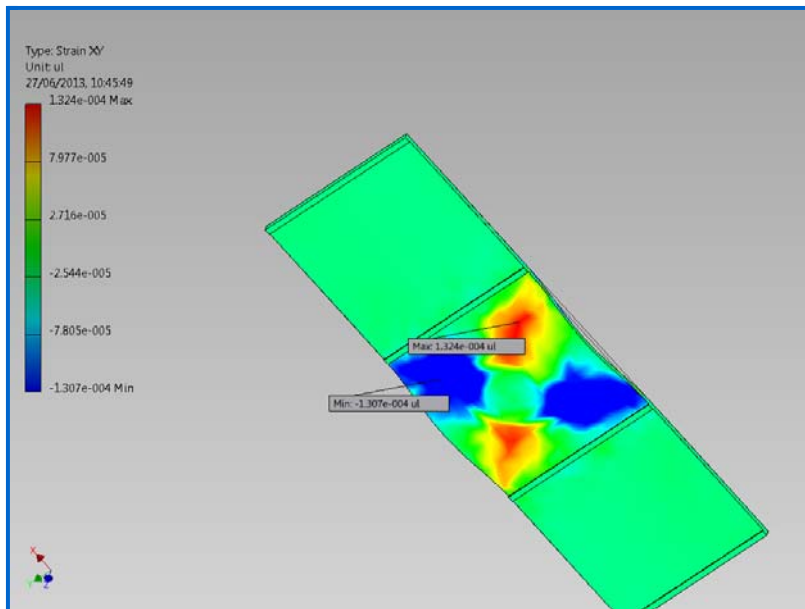


### Strain XX

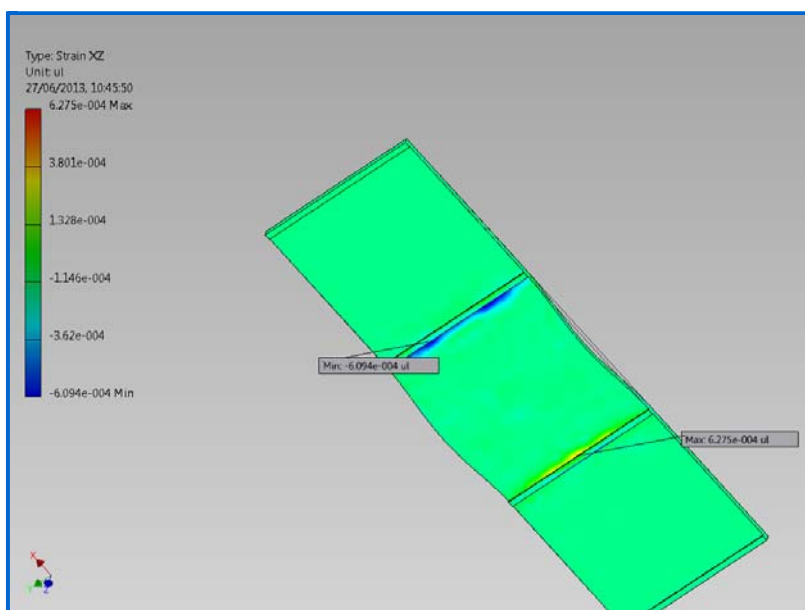
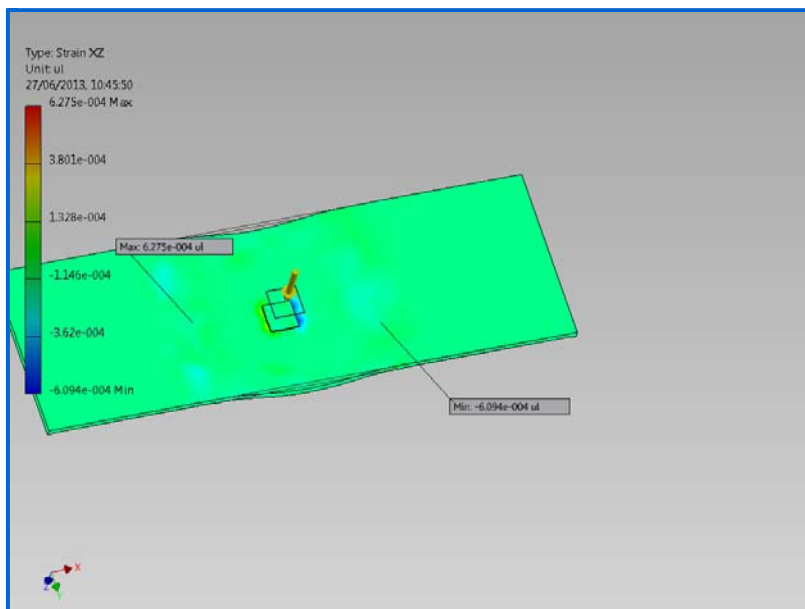


☐ Strain XY

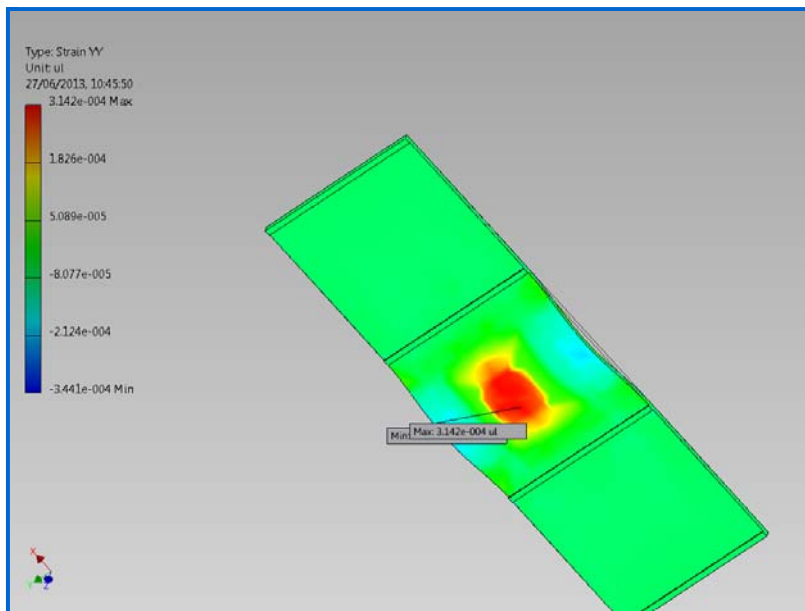
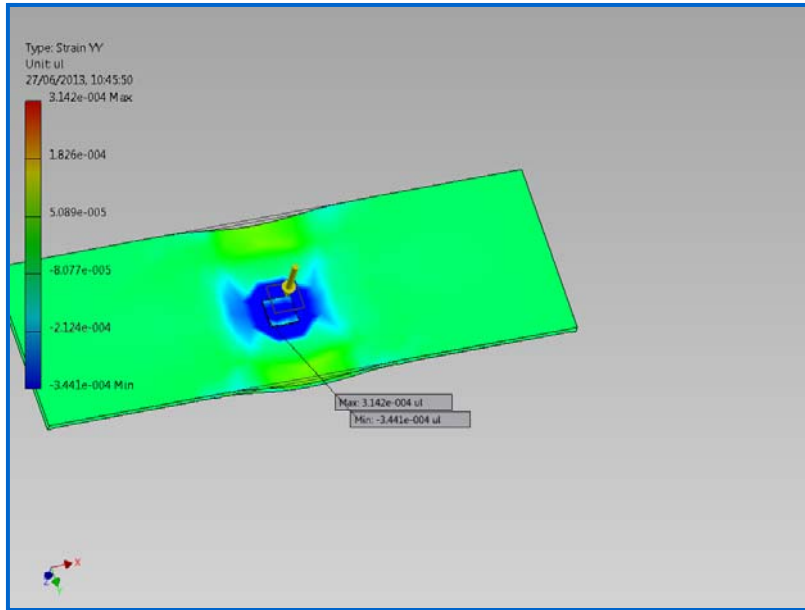




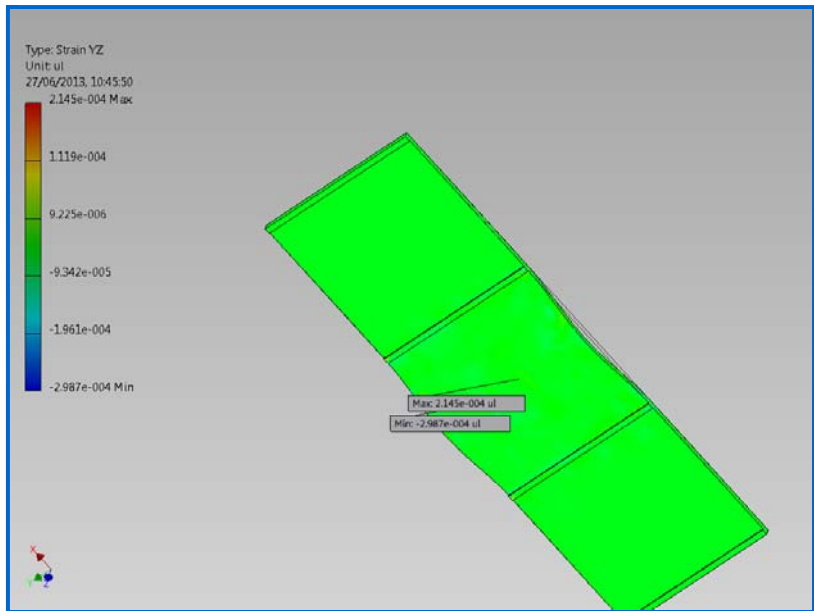
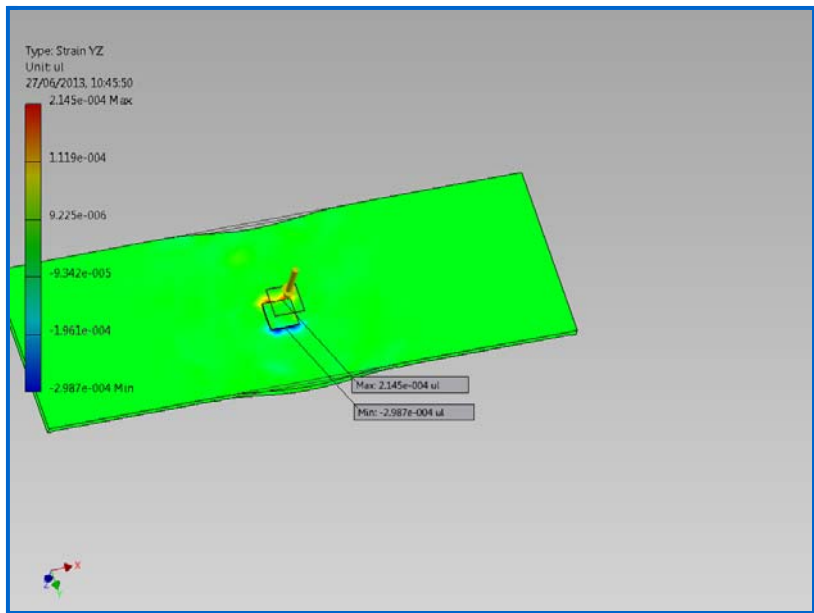
☐ Strain XZ



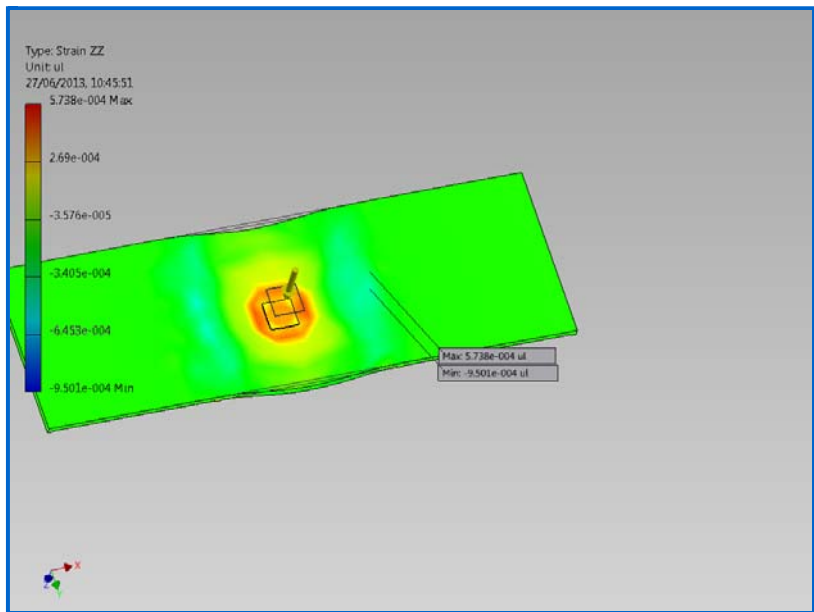
☐ Strain YY

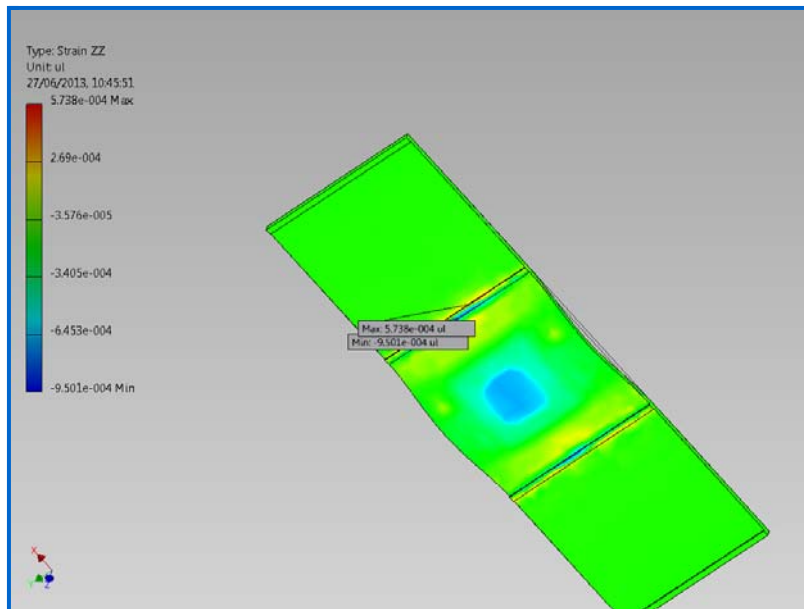


☐ Strain YZ



☐ Strain ZZ





### 20mm MgO Corp MA Floor 3.0kPa1800 600 Load Analysis:1

#### General objective and settings:

Design Objective	Single Point
Simulation Type	Static Analysis
Last Modification Date	27/06/2013, 10:44
Detect and Eliminate Rigid Body Modes	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

#### Material(s)

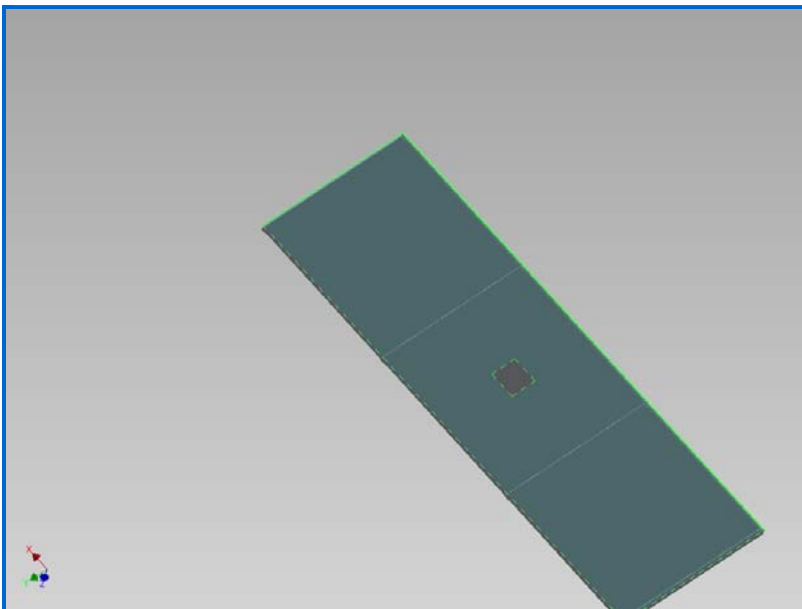
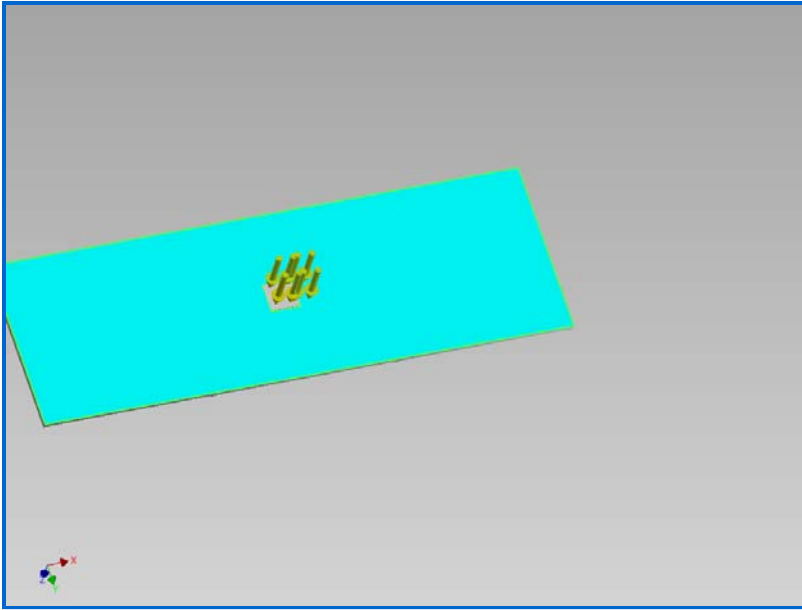
Name	MgO MA 20mm	
General	Mass Density	0.93 g/cm <sup>3</sup>
	Yield Strength	8.1 MPa
	Ultimate Tensile Strength	8.1 MPa
Stress	Young's Modulus	5.56 GPa
	Poisson's Ratio	0.35 ul
	Shear Modulus	2.05926 GPa
Stress Thermal	Expansion Coefficient	0 ul/c
	Thermal Conductivity	0 W/( m K )
	Specific Heat	0 J/( kg c )
Part Name(s)	20mm MgO Floor 1800 600	

#### Operating conditions

##### Pressure:1

Load Type	Pressure
Magnitude	0.003 MPa

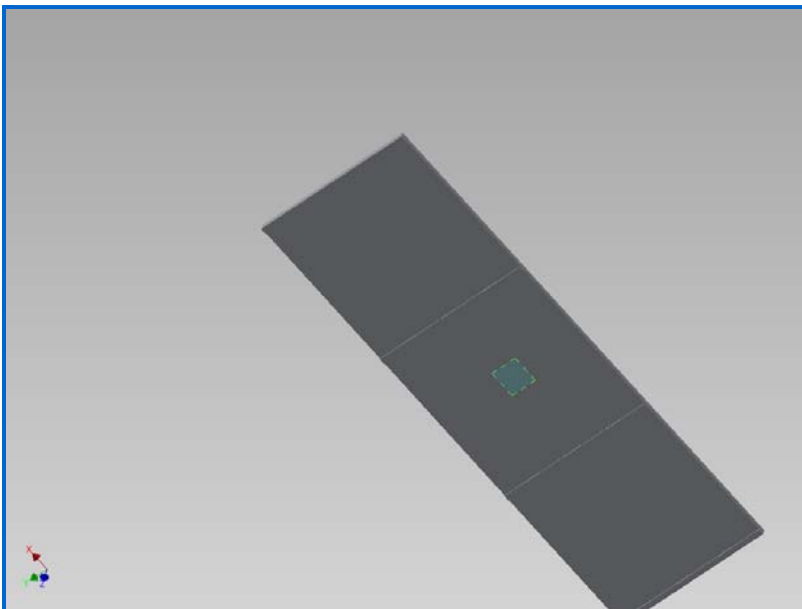
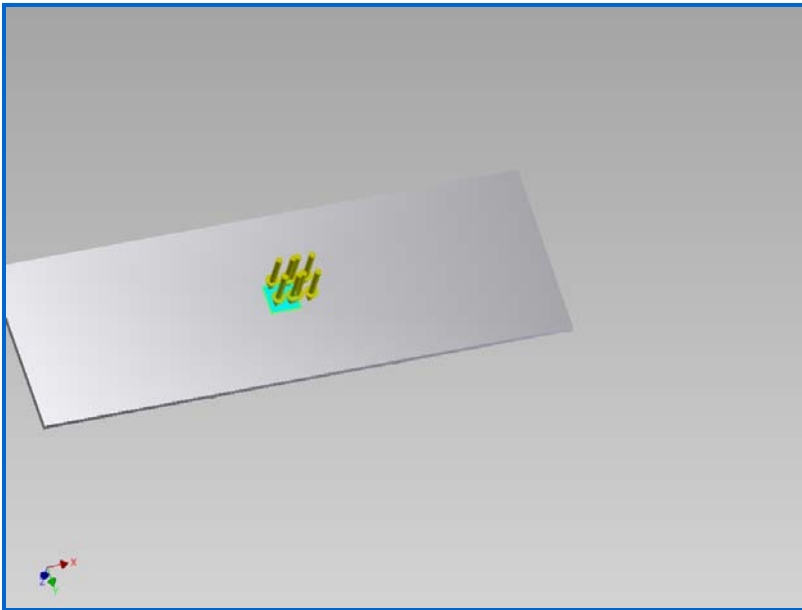
☐ Selected Face(s)



☐ Pressure:2

Load Type	Pressure
Magnitude	0.003 MPa

☐ Selected Face(s)

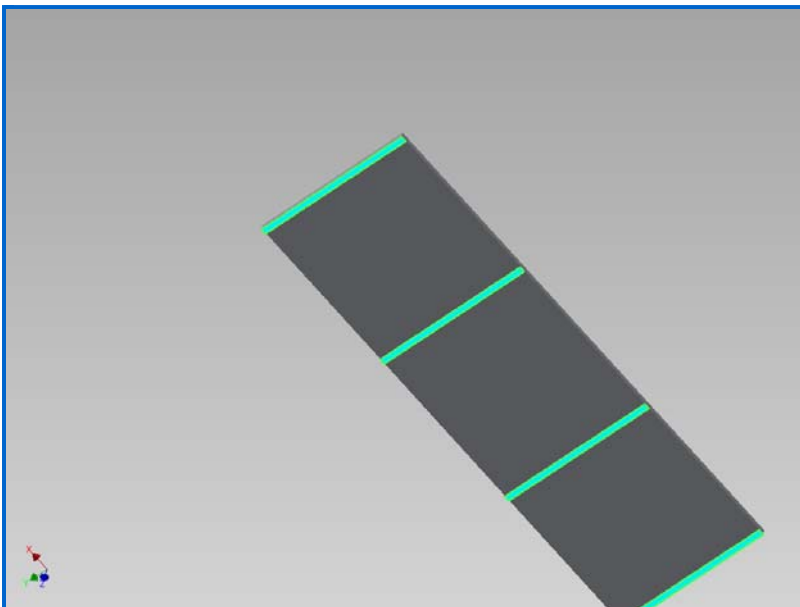
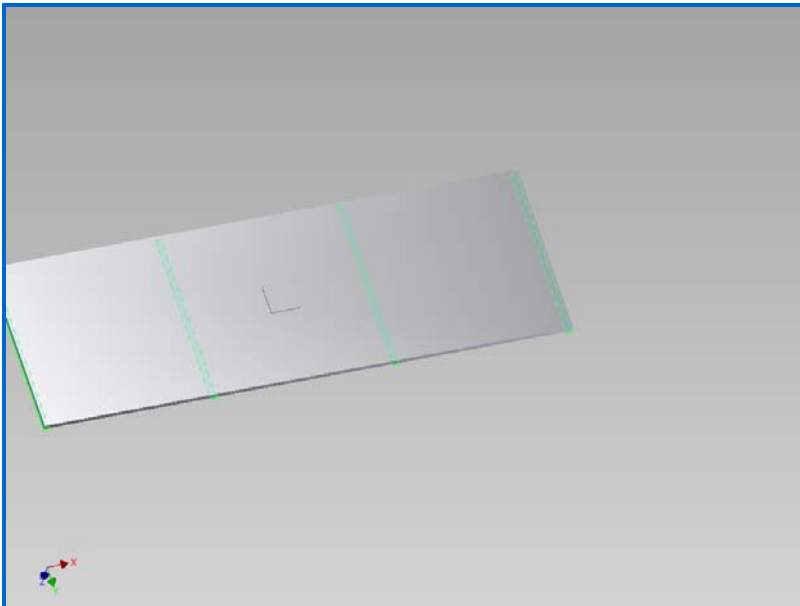


☐ **Fixed Constraint: 1**

Constraint Type Fixed Constraint

☐ **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)
Fixed Constraint:1	3240 N	0 N	16.1151 N m	0 N m
		0 N		16.1151 N m
		-3240 N		0 N m

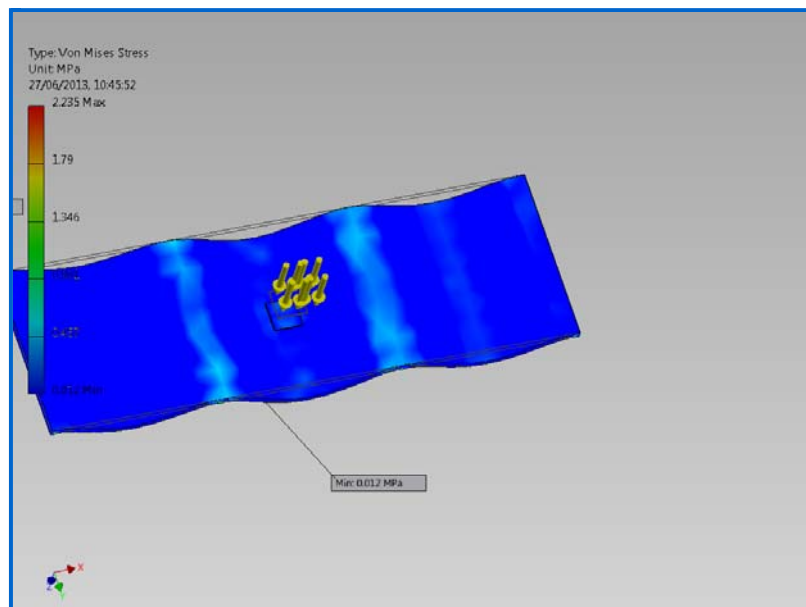
☐ **Result Summary**

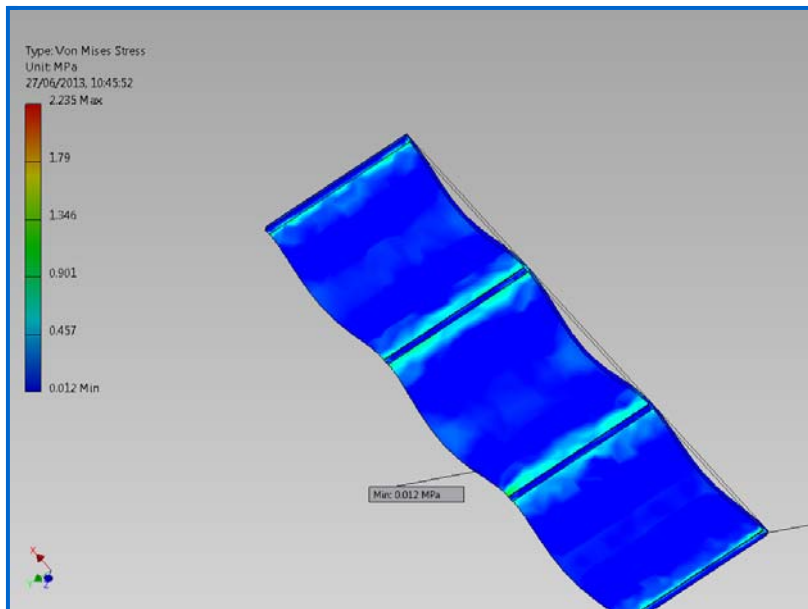
Name	Minimum	Maximum
Volume	21890000 mm <sup>3</sup>	
Mass	20.3577 kg	
Von Mises Stress	0.0123535 MPa	2.23488 MPa
1st Principal Stress	-1.08892 MPa	1.12876 MPa
3rd Principal Stress	-3.11402 MPa	0.338848 MPa
Displacement	0 mm	0.280363 mm

Safety Factor	3.62436 ul	15 ul
Stress XX	-1.583 MPa	1.01589 MPa
Stress XY	-0.138954 MPa	0.122286 MPa
Stress XZ	-0.911186 MPa	0.911804 MPa
Stress YY	-1.29346 MPa	0.483273 MPa
Stress YZ	-0.558118 MPa	0.570196 MPa
Stress ZZ	-2.77927 MPa	1.01116 MPa
X Displacement	-0.0149802 mm	0.0150805 mm
Y Displacement	-0.00417881 mm	0.00432863 mm
Z Displacement	-0.00206249 mm	0.280363 mm
Equivalent Strain	0.0000020114 ul	0.000383697 ul
1st Principal Strain	0.000000792488 ul	0.000166004 ul
3rd Principal Strain	-0.000439627 ul	0.0000017077 ul
Strain XX	-0.000232129 ul	0.000153449 ul
Strain XY	-0.0000337388 ul	0.0000296916 ul
Strain XZ	-0.000221241 ul	0.000221391 ul
Strain YY	-0.0000452355 ul	0.0000749773 ul
Strain YZ	-0.000135514 ul	0.000138447 ul
Strain ZZ	-0.000358347 ul	0.000139393 ul

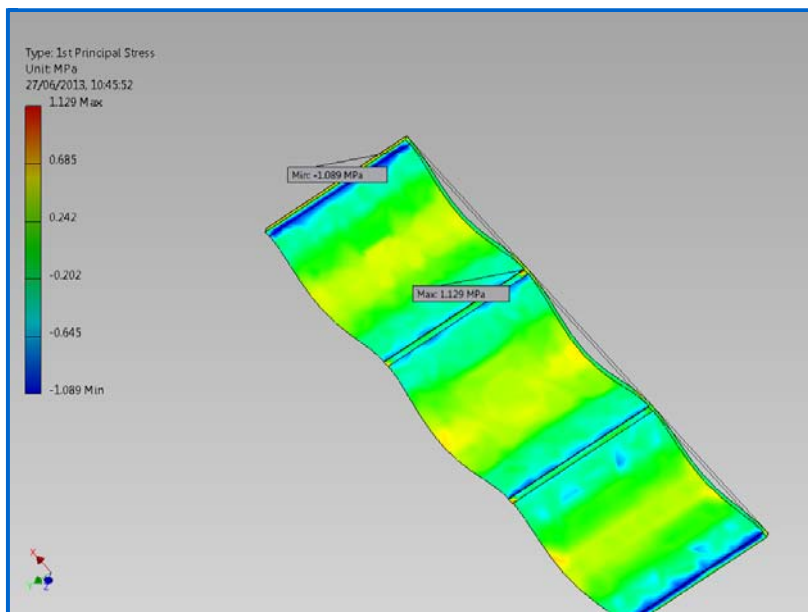
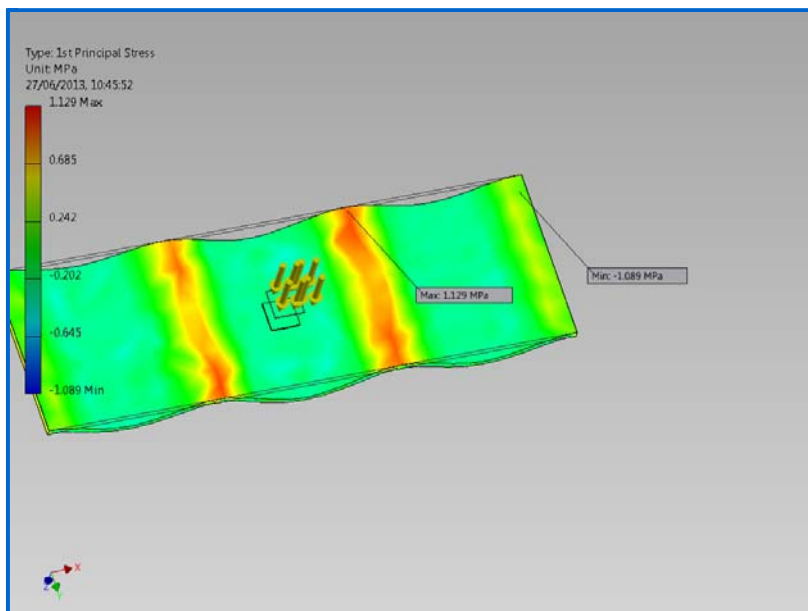
## Figures

### Von Mises Stress

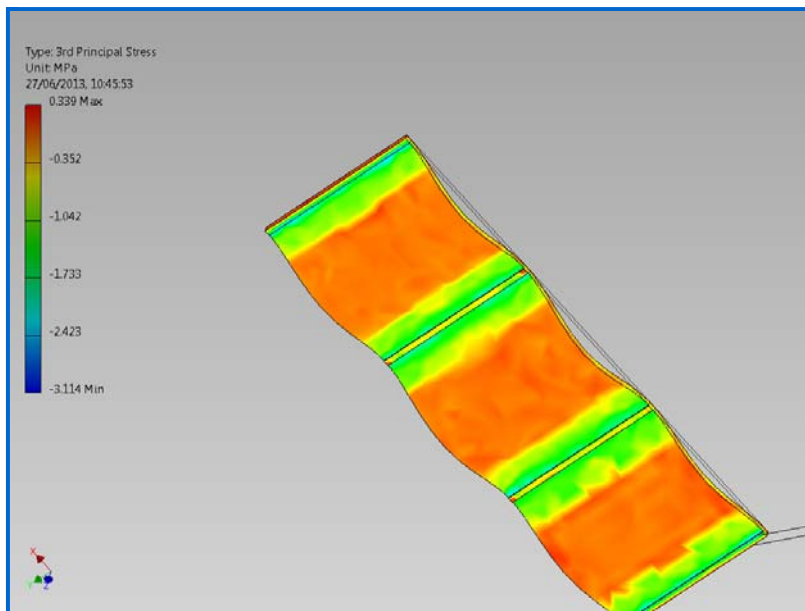
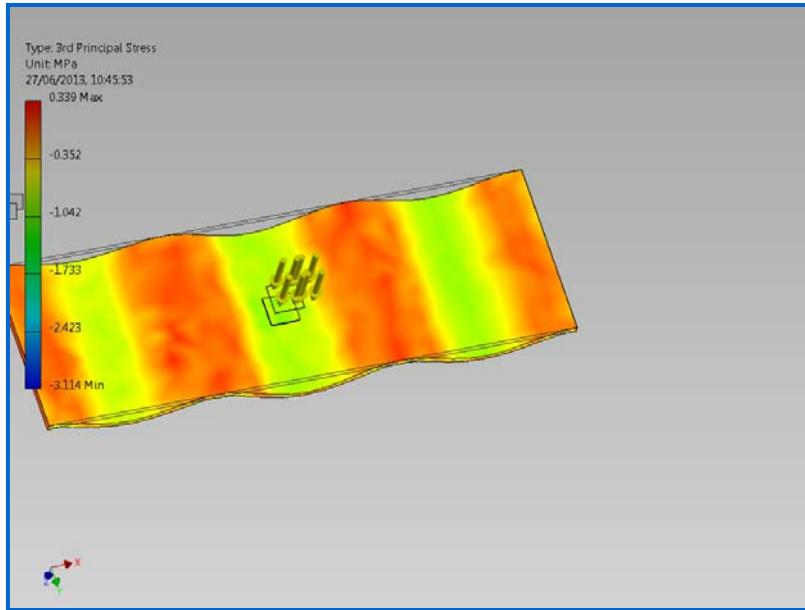




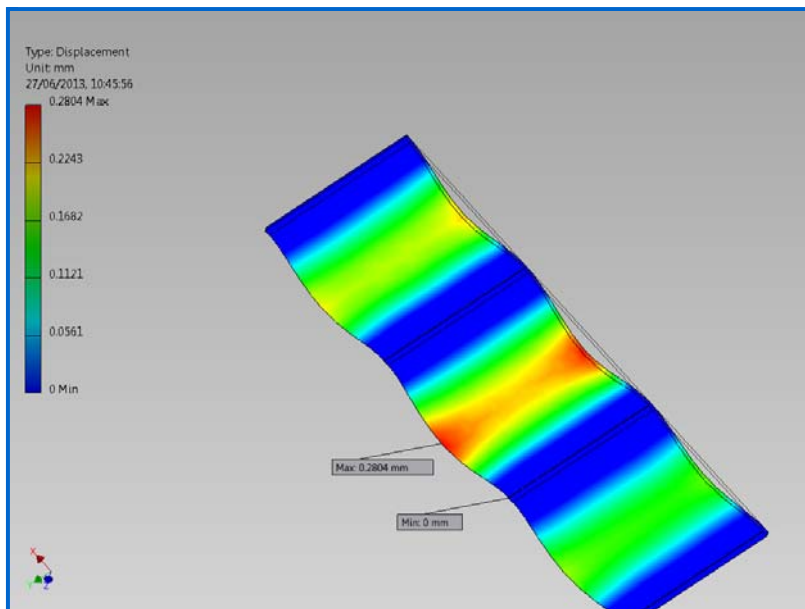
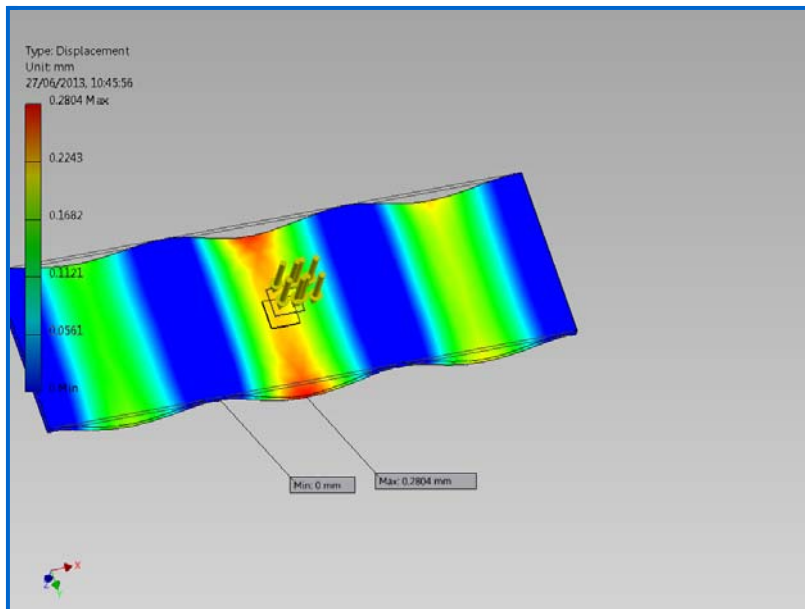
1st Principal Stress



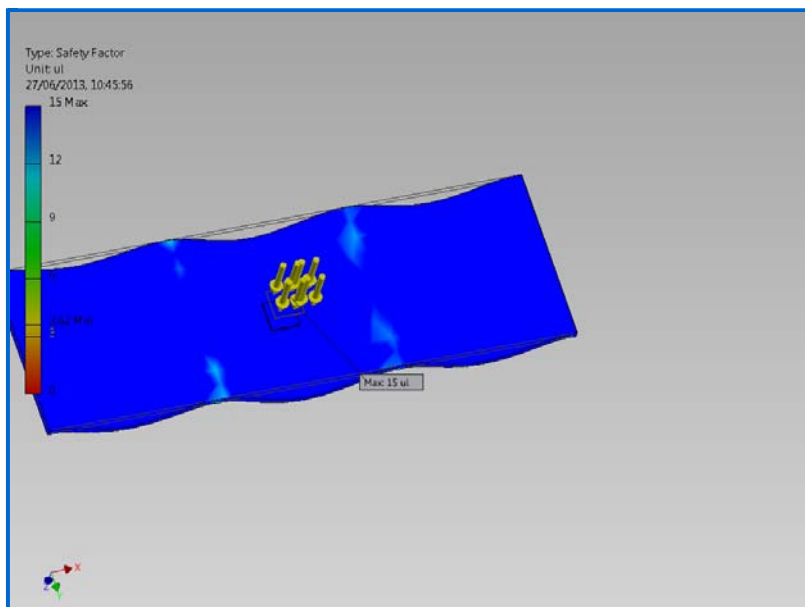
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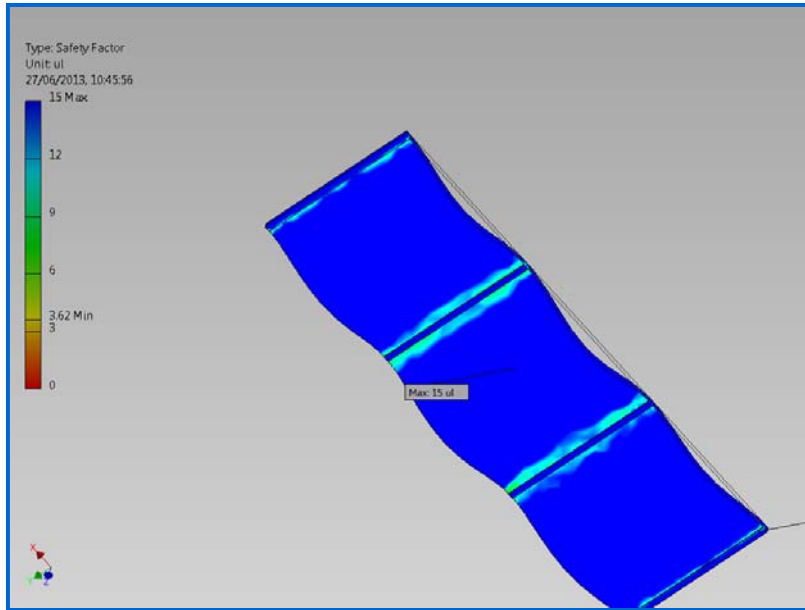


☐ Displacement

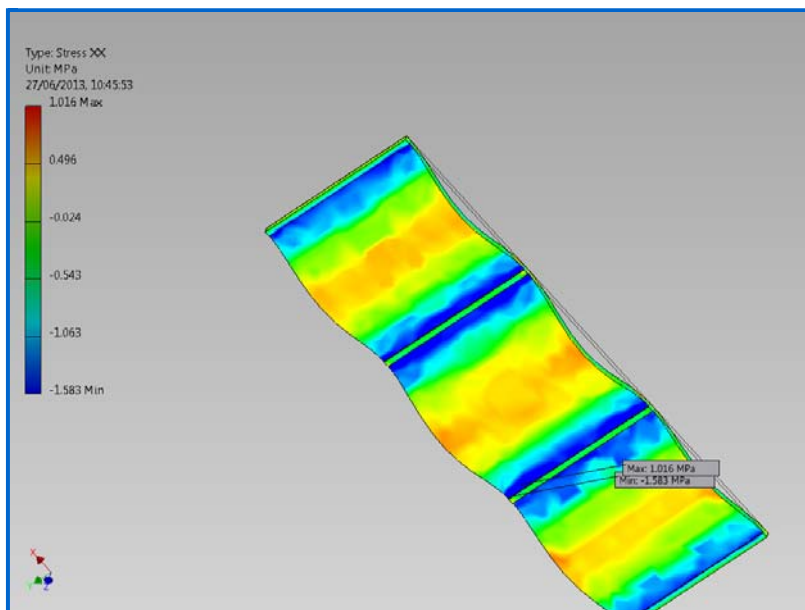
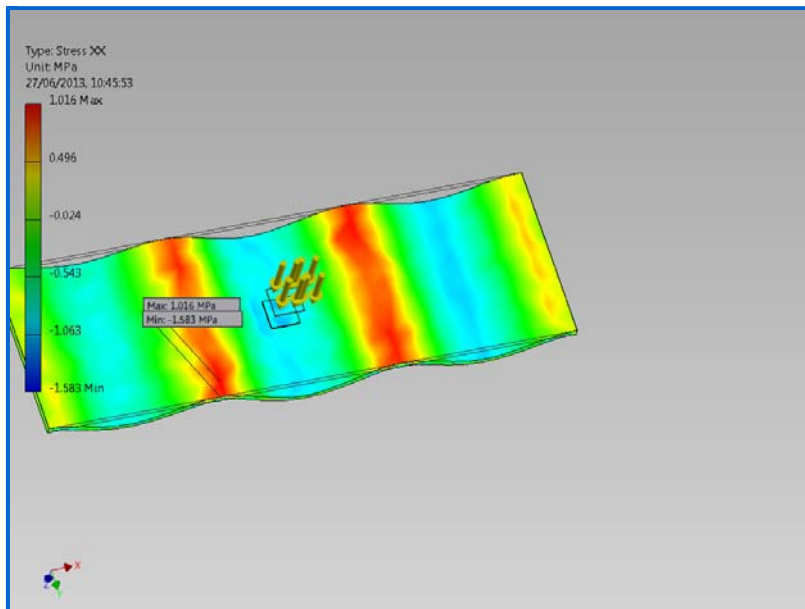


### ☐ Safety Factor

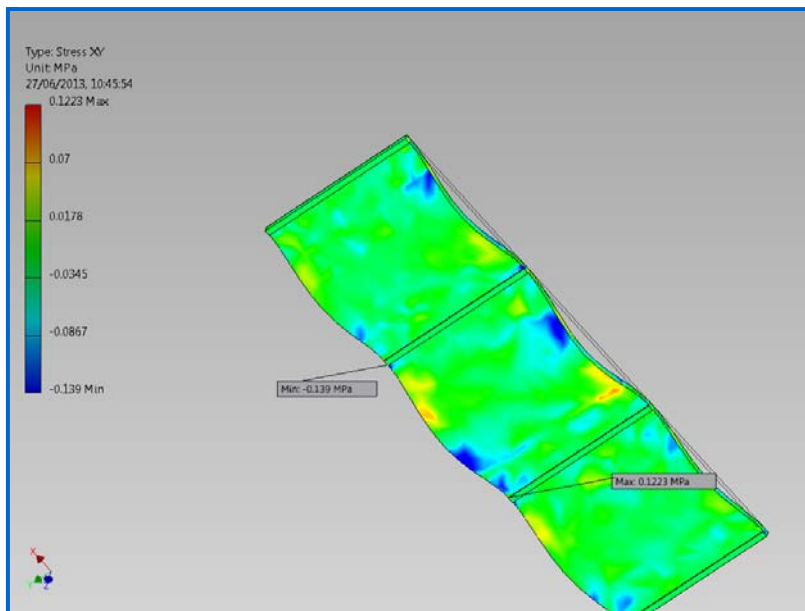
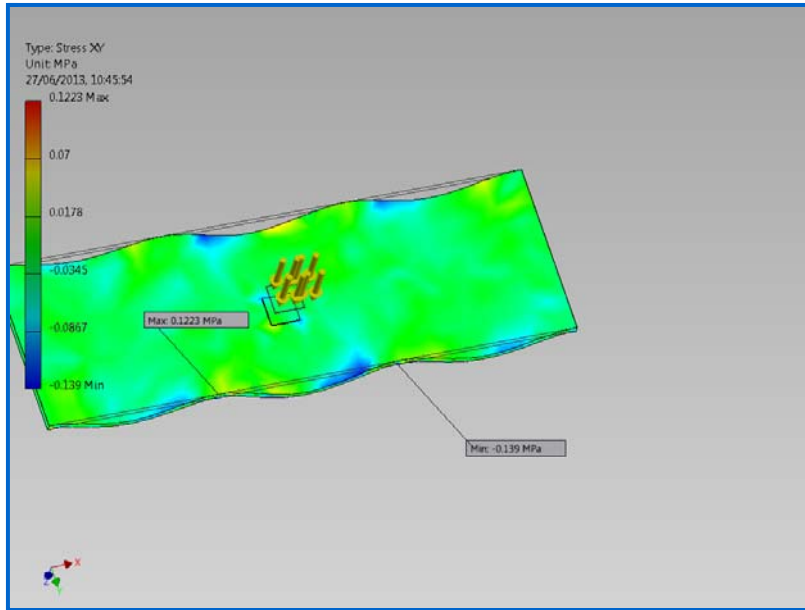




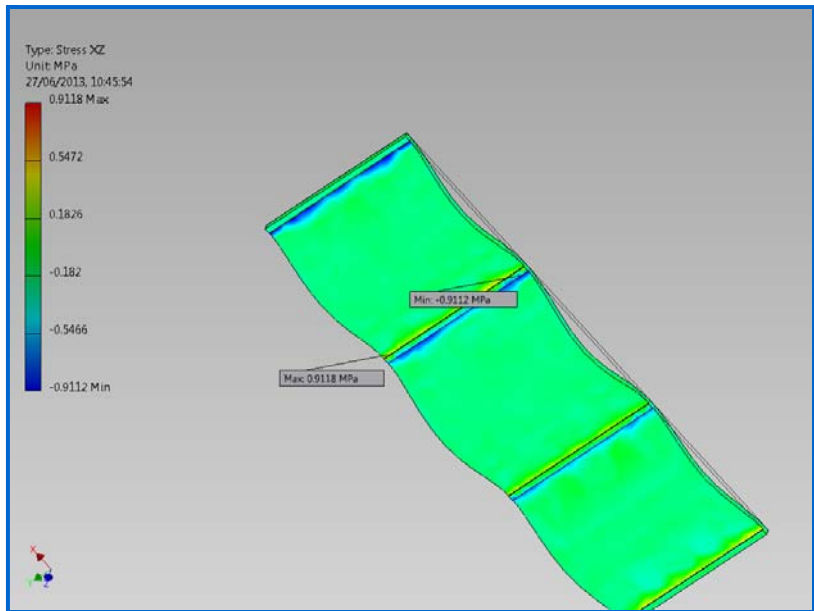
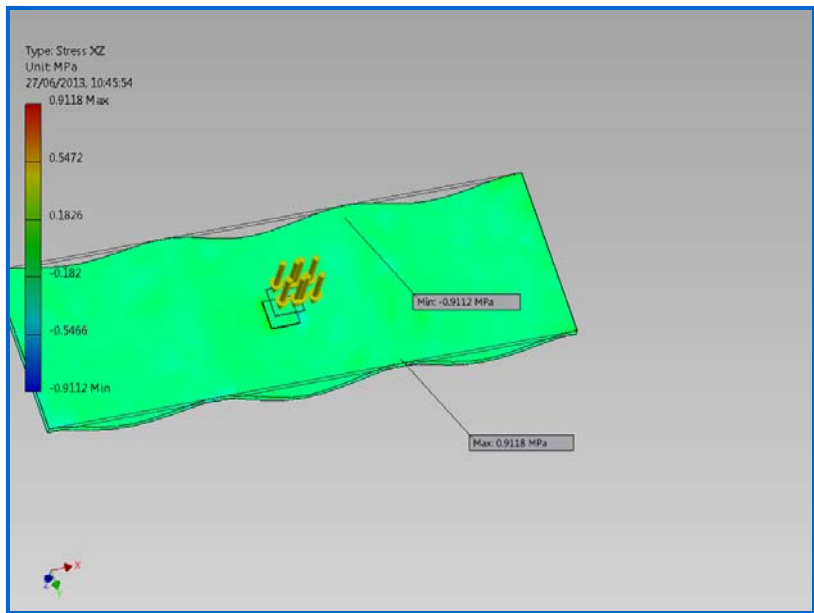
☐ Stress XX



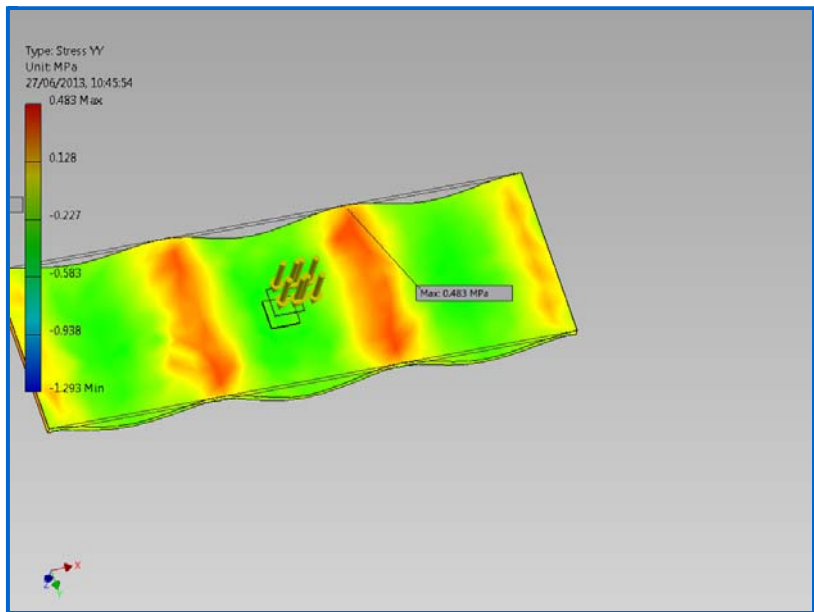
☐ Stress XY



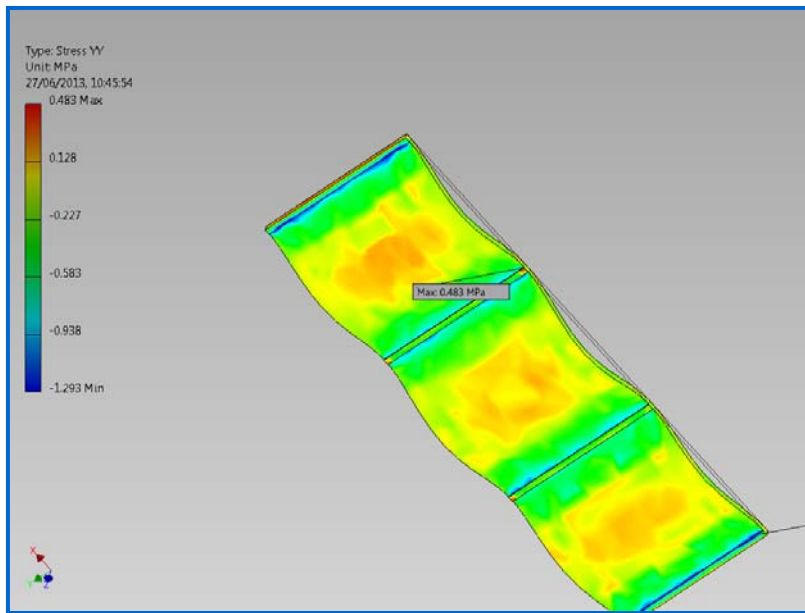
☐ Stress XZ



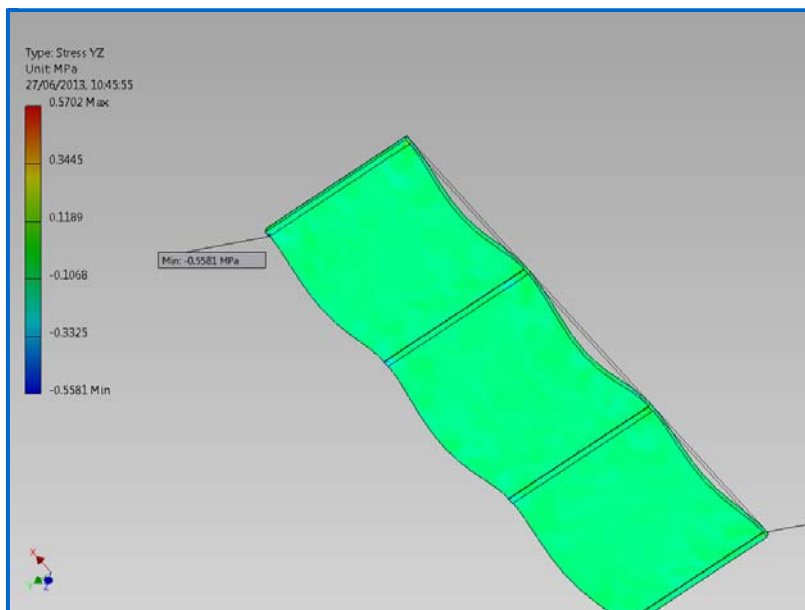
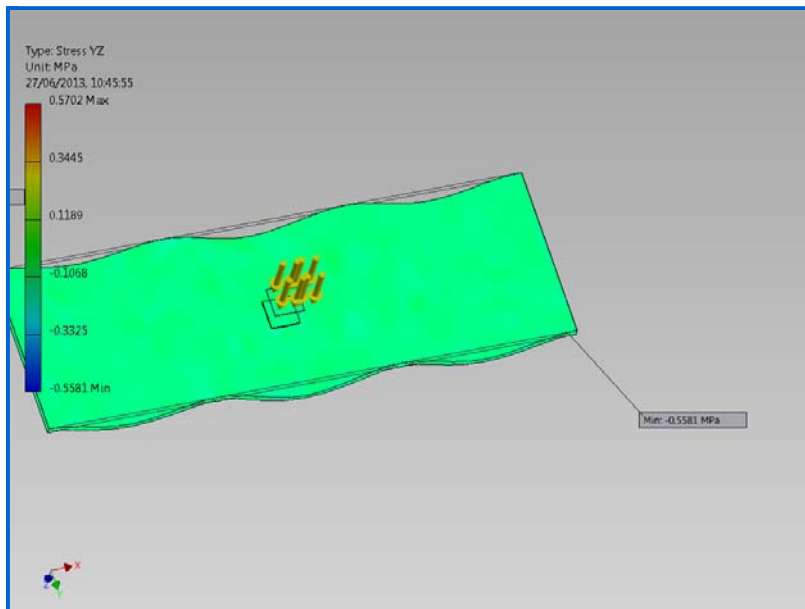
☐ Stress YY



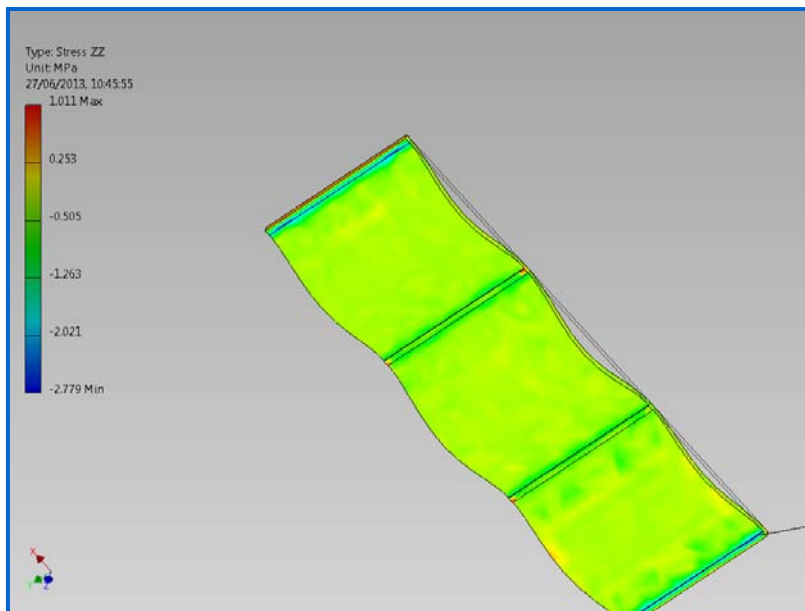
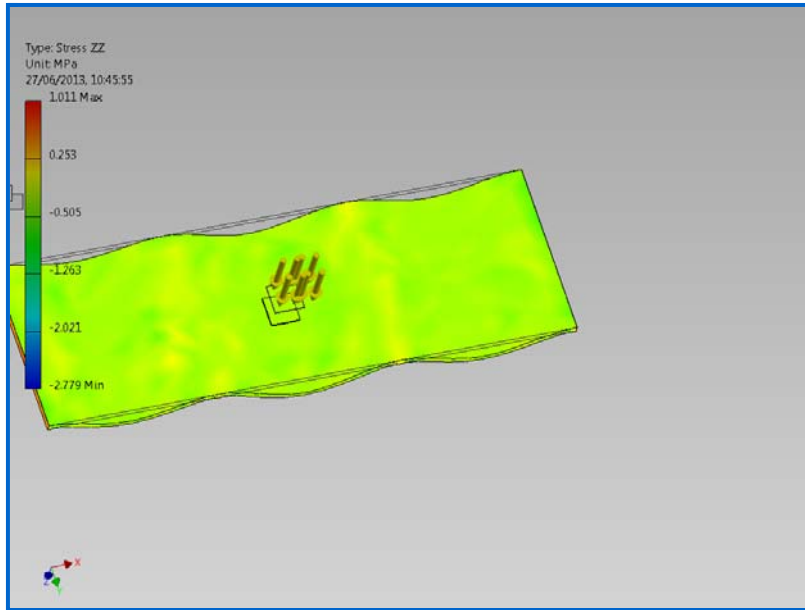




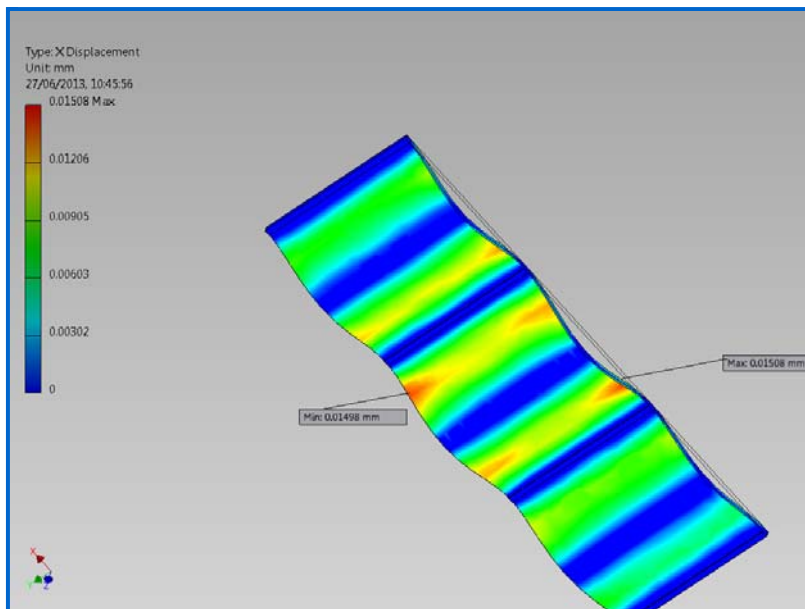
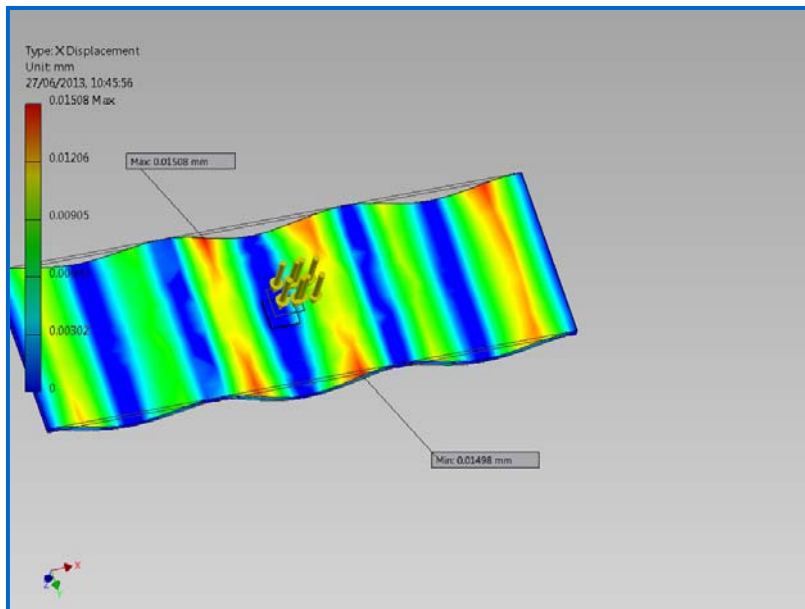
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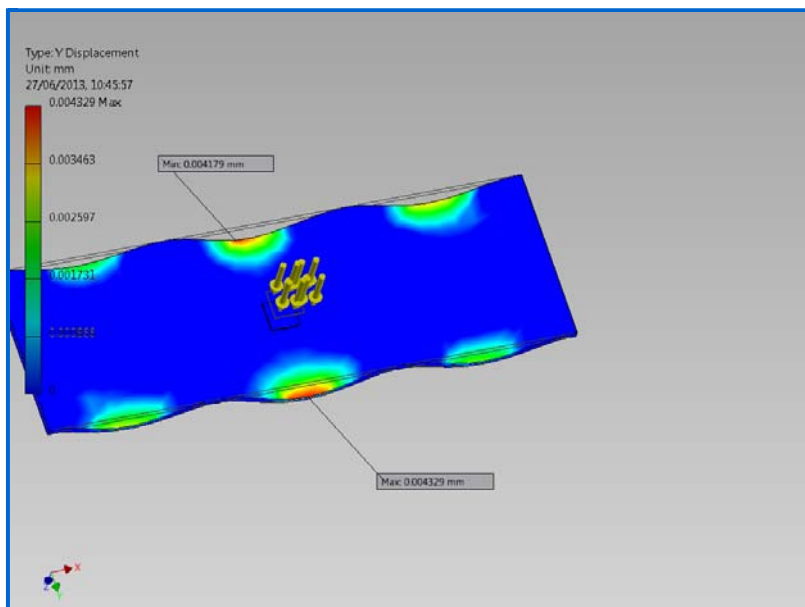
☐ Stress ZZ

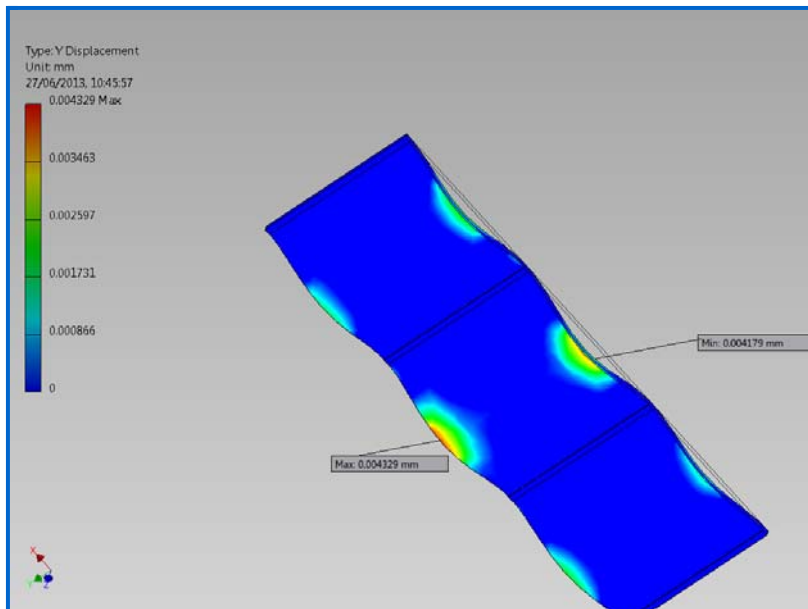


☐ X Displacement

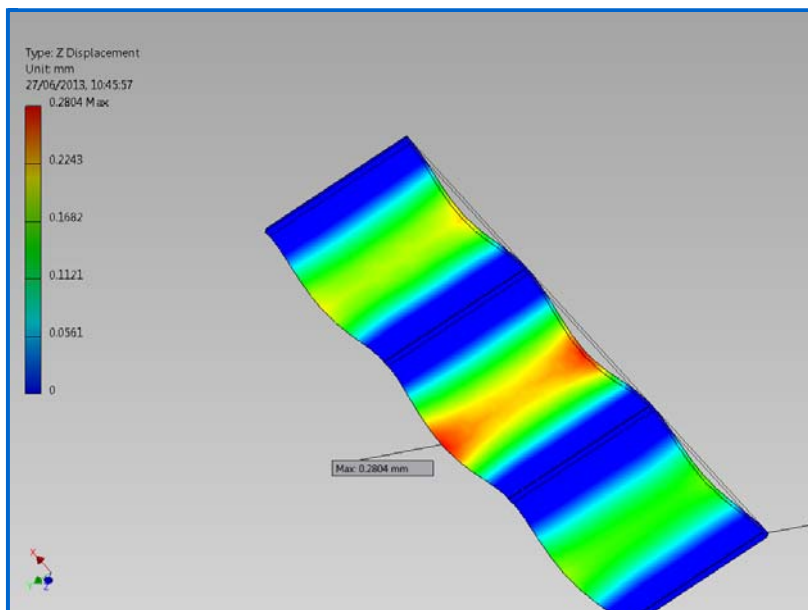
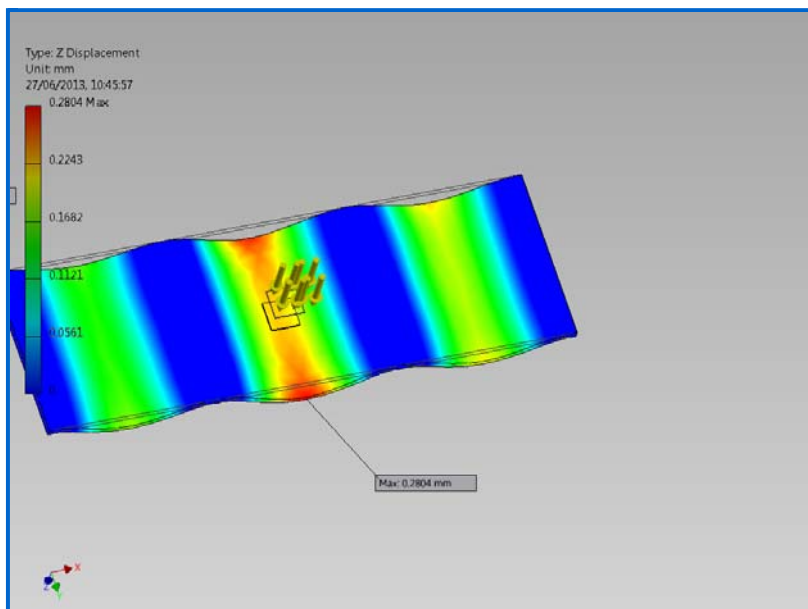


Y Displacement

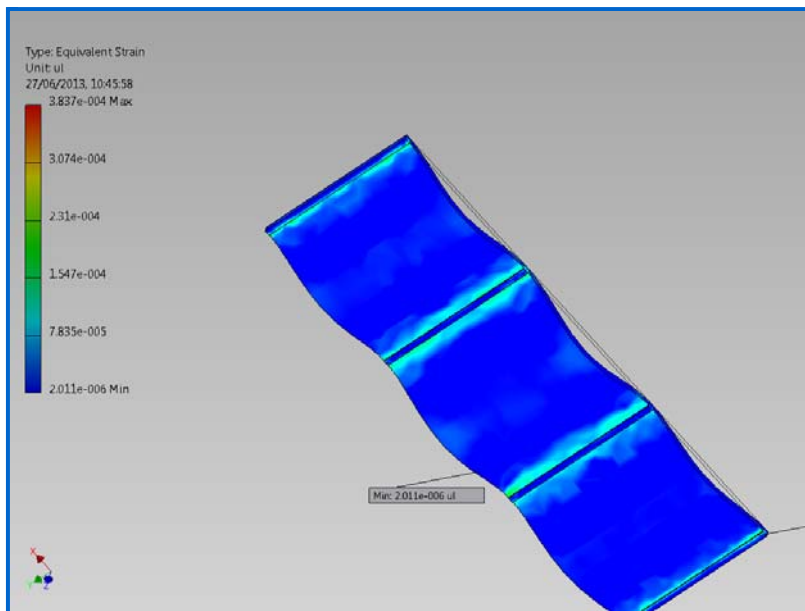
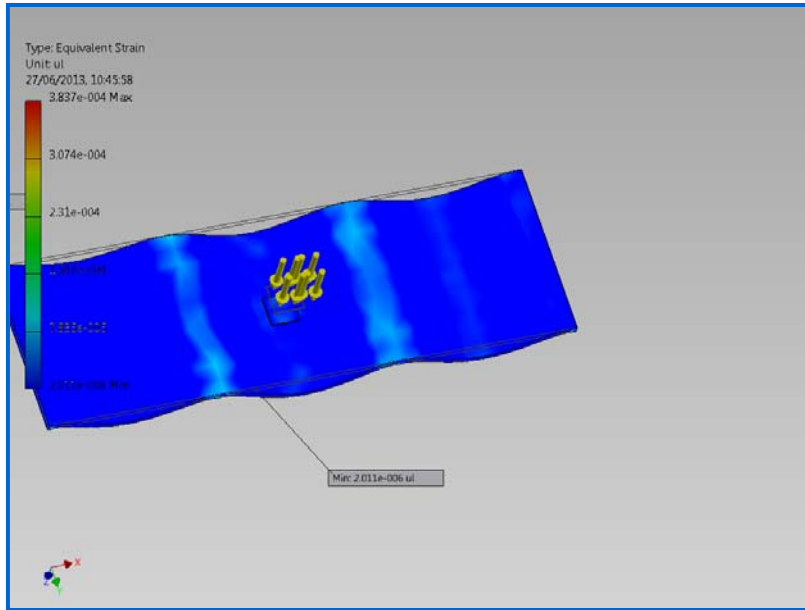




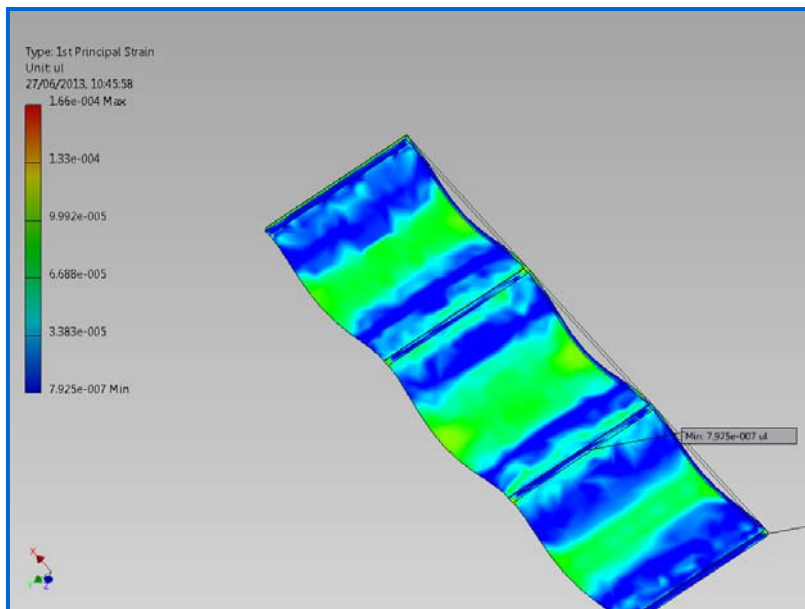
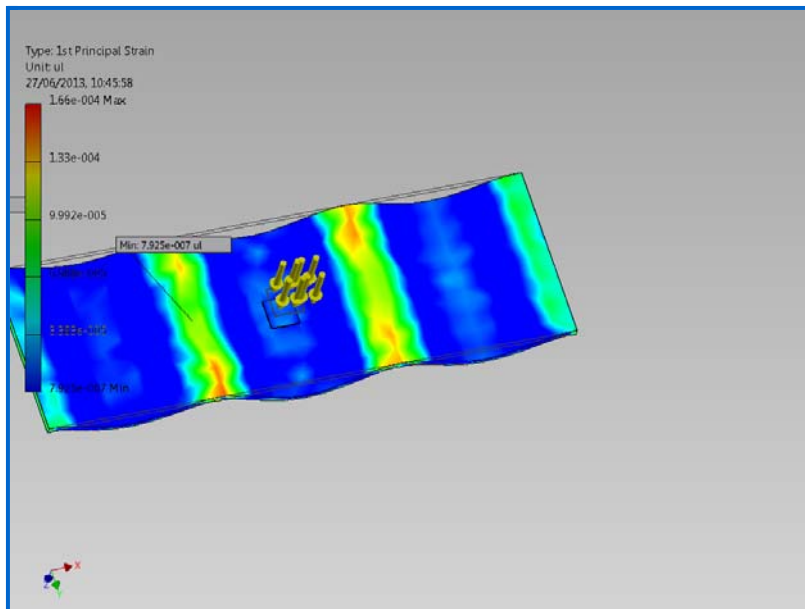
**Z Displacement**



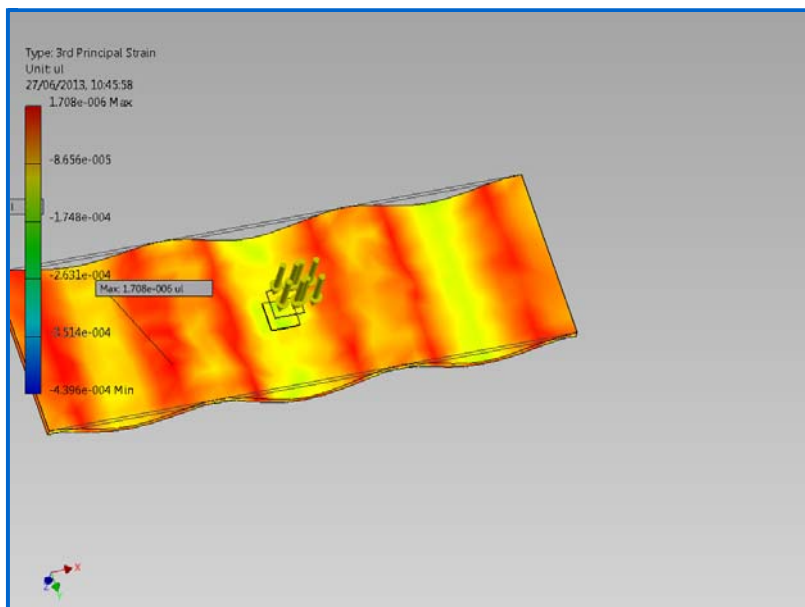
☐ Equivalent Strain

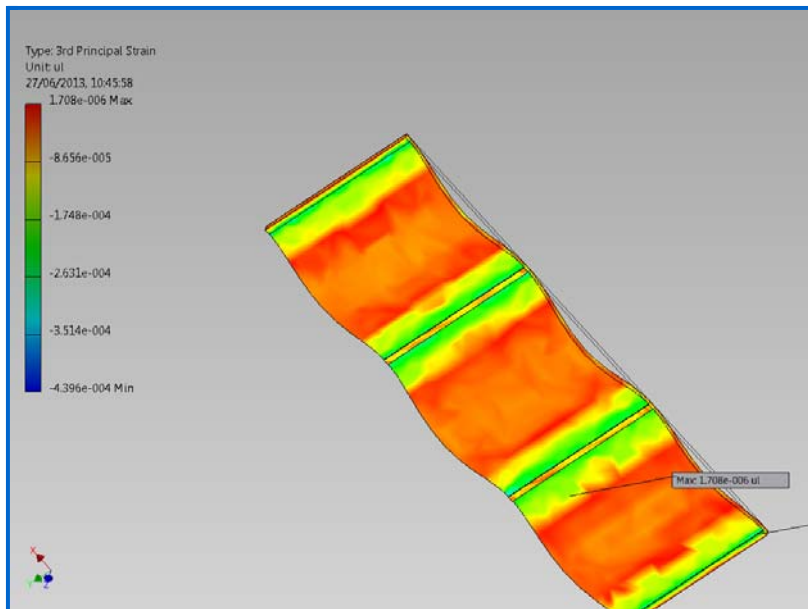


☐ 1st Principal Strain

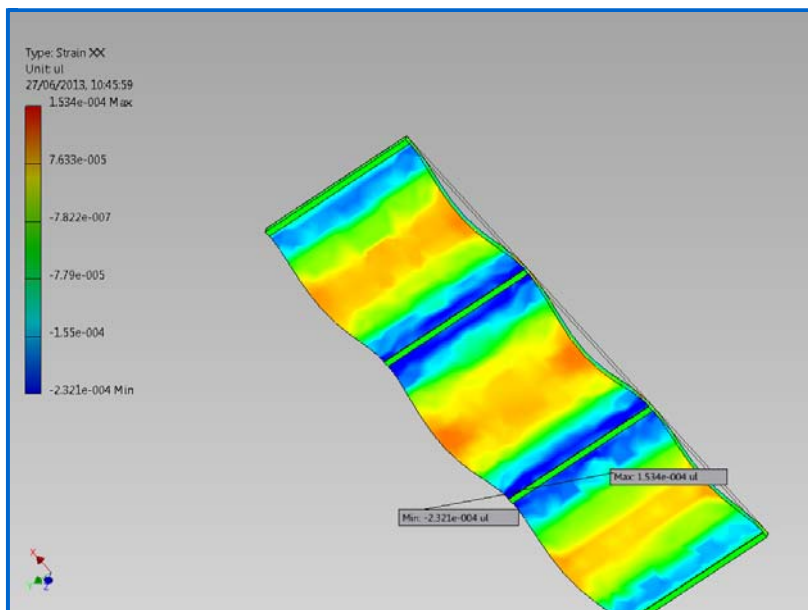
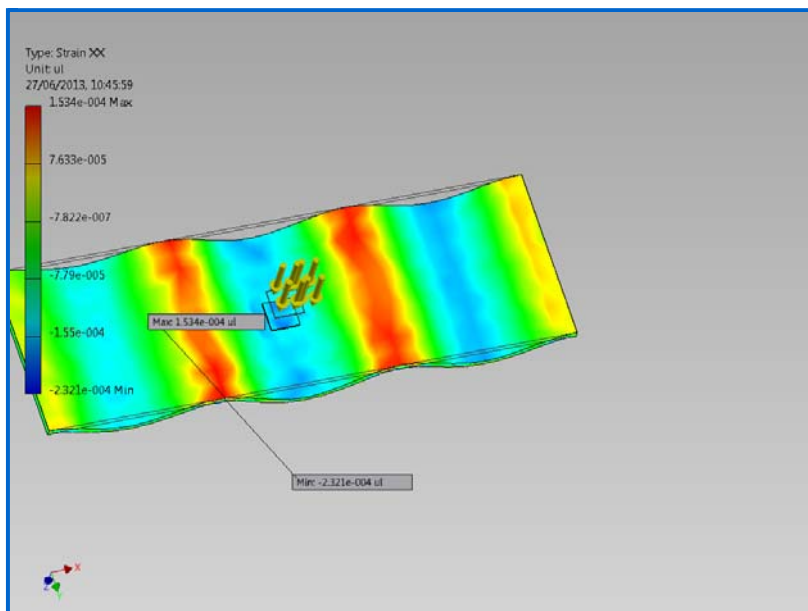


☐ 3rd Principal Strain

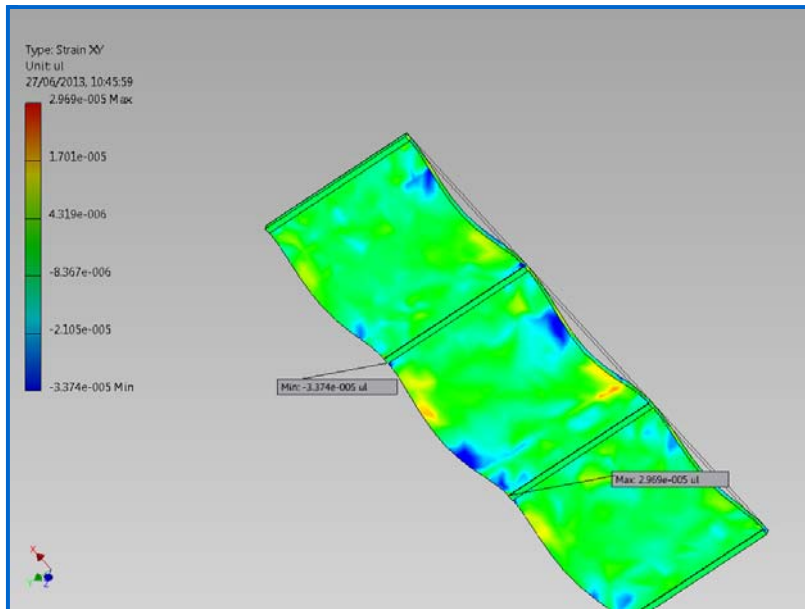
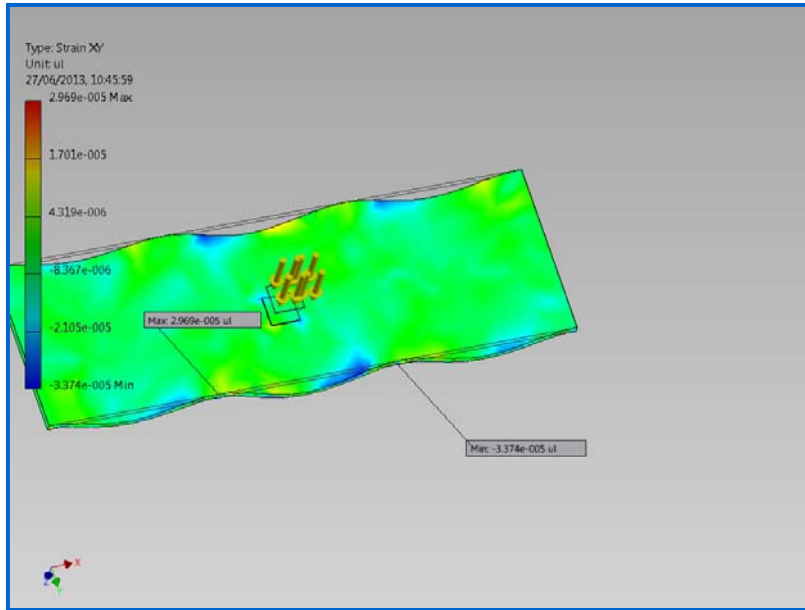




☐ Strain XX

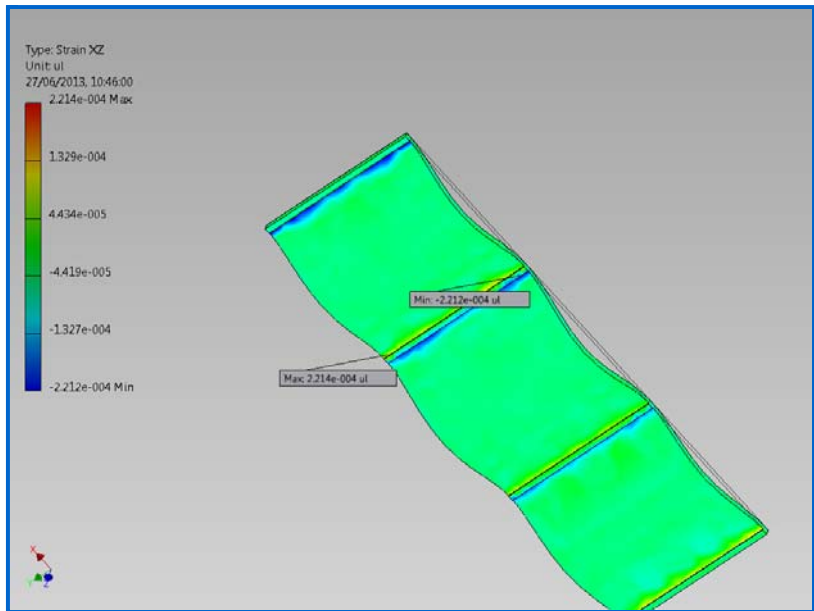
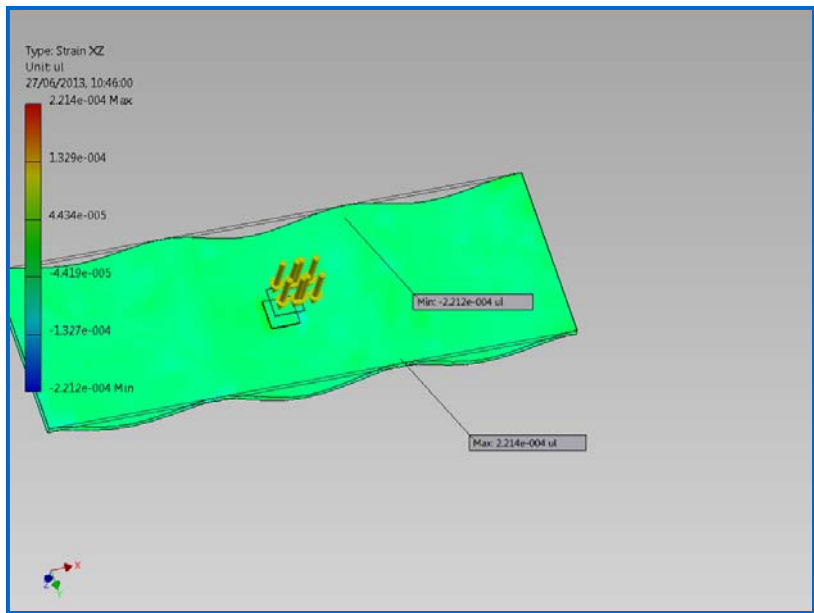


☐ Strain XY

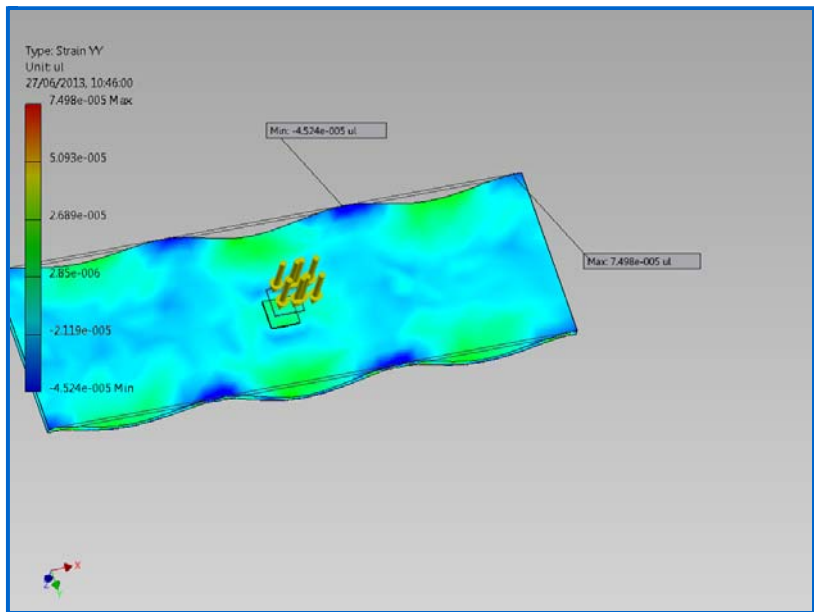


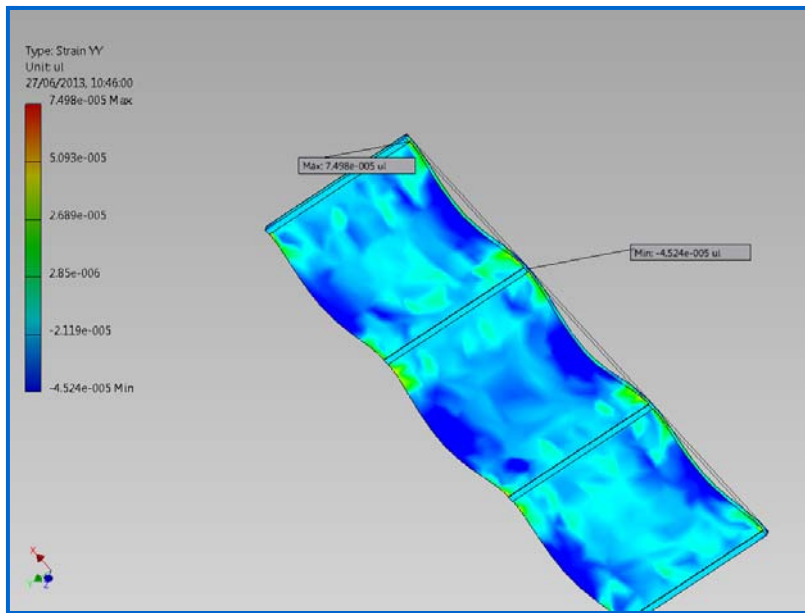
☐ Strain XZ



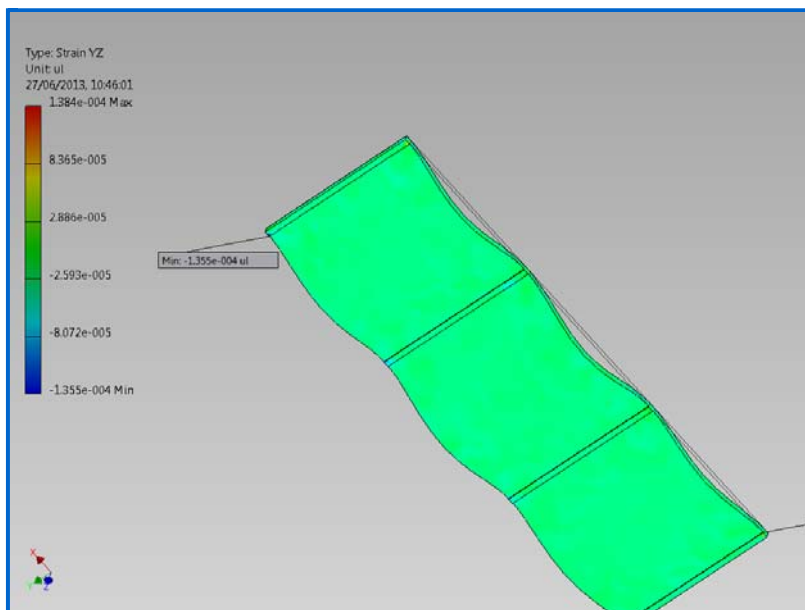
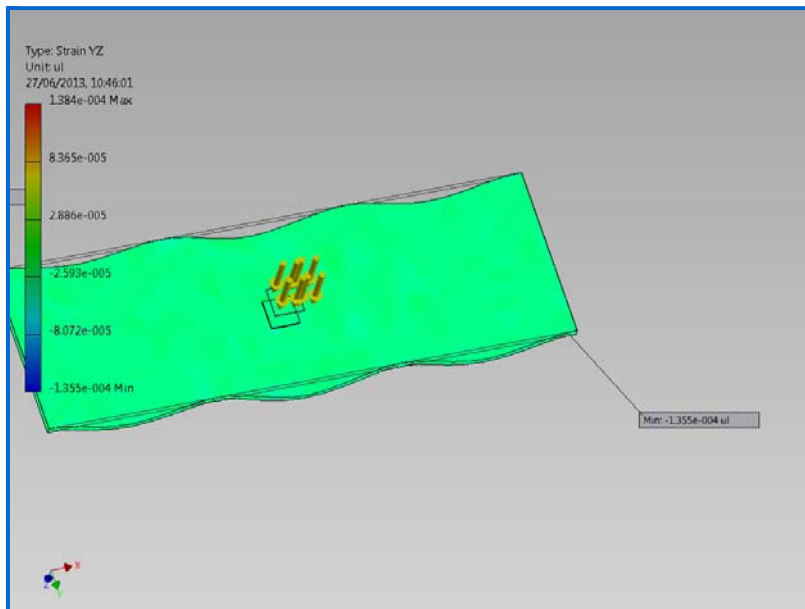


☐ Strain YY

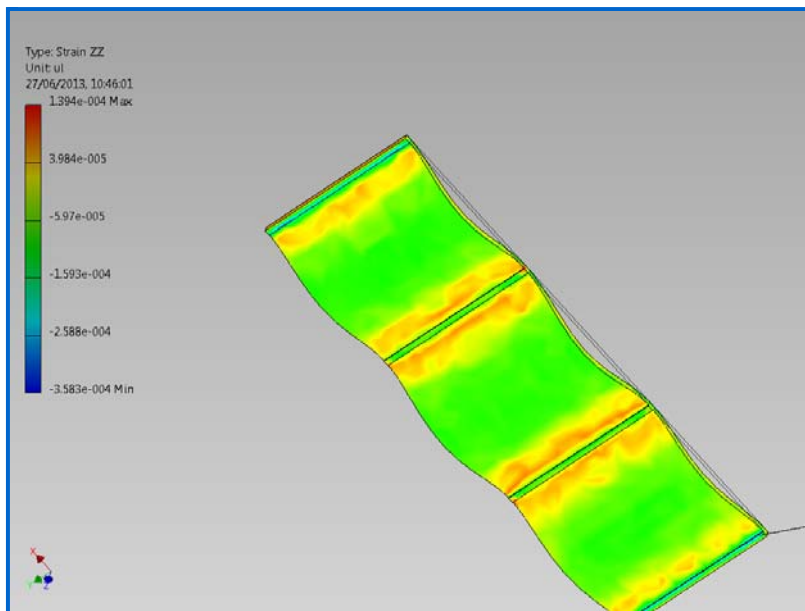
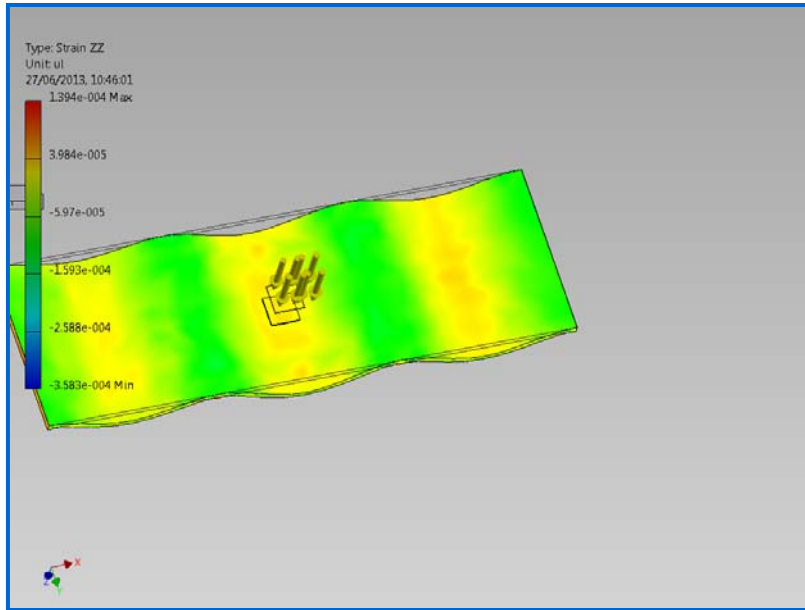




☐ Strain YZ



☐ Strain ZZ



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