

stress analysis 588,6 rev carbon



Analyzed File:	Assembly 2.iam
Autodesk Inventor Version:	2018 (Build 220112000, 112)
Creation Date:	10/03/2021, 18.14
Study Author:	Priyo Nugroho Rofiyanto
Summary:	

Project Info (iProperties)

Summary

Author fiyan

Project

Part Number	Assembly 2
Designer	fiyan
Cost	Rp0
Date Created	26/01/2021

Status

Design Status WorkInProgress

Physical

Mass	16,9311 kg
Area	1301720 mm ²
Volume	6091210 mm ³
Center of Gravity	x=-295,24 mm y=-10,7989 mm z=-74,4769 mm

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

Static Analysis:2

General objective and settings:

Design Objective	Single Point
Study Type	Static Analysis
Last Modification Date	10/03/2021, 17.51
Detect and Eliminate Rigid Body Modes	Yes
Separate Stresses Across Contact Surfaces	No
Motion Loads Analysis	No

Mesh 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	No
Use part based measure for Assembly mesh	Yes

Material(s)

Name	Steel, Carbon	
General	Mass Density	7,85 g/cm ³
	Yield Strength	350 MPa
	Ultimate Tensile Strength	420 MPa
Stress	Young's Modulus	200 GPa
	Poisson's Ratio	0,29 ul
	Shear Modulus	77,5194 GPa
Part Name(s)	frame1 ISO D 36 x ID 16 00000001.ipt ISO D 36 x ID 16 00000002.ipt ISO D 36 x ID 16 00000003.ipt ISO D 36 x ID 16 00000004.ipt ISO D 36 x ID 16 00000005.ipt ISO D 36 x ID 16 00000006.ipt ISO D 36 x ID 16 00000007.ipt ISO D 36 x ID 16 00000008.ipt ISO D 36 x ID 16 00000009.ipt ISO D 36 x ID 16 00000010.ipt ISO D 36 x ID 16 00000011.ipt ISO D 36 x ID 16 00000012.ipt ISO D 36 x ID 16 00000013.ipt ISO D 36 x ID 16 00000014.ipt ISO D 36 x ID 16 00000015.ipt ISO D 36 x ID 16 00000016.ipt ISO D 36 x ID 16 00000017.ipt ISO D 36 x ID 16 00000018.ipt ISO 70x 15 00000019.ipt ISO D 36 x ID 20 00000020.ipt ISO D 40 x ID 20 00000038.ipt ISO D 40 x ID 20 00000043.ipt ISO D 36 x ID 16 00000045.ipt ISO D 36 x ID 16 00000046.ipt ISO D 36 x ID 16 00000047.ipt Skeleton0003_MIR ISO D 36 x ID 16 00000001_MIR ISO D 36 x ID 16 00000002_MIR ISO D 36 x ID 16 00000003_MIR ISO D 36 x ID 16 00000004_MIR ISO D 36 x ID 16 00000005_MIR ISO D 36 x ID 16 00000006_MIR ISO D 36 x ID 16 00000007_MIR ISO D 36 x ID 16 00000008_MIR ISO D 36 x ID 16 00000009_MIR ISO D 36 x ID 16 00000010_MIR ISO D 36 x ID 16 00000011_MIR ISO D 36 x ID 16 00000012_MIR ISO D 36 x ID 16 00000013_MIR ISO D 36 x ID 16 00000014_MIR ISO D 36 x ID 16 00000015_MIR ISO D 36 x ID 16 00000016_MIR ISO D 36 x ID 16 00000017_MIR ISO D 36 x ID 16 00000018_MIR ISO 70x 15 00000019_MIR ass plate ass plate	
Name	Generic	
General	Mass Density	1 g/cm ³
	Yield Strength	0 MPa
	Ultimate Tensile Strength	0 MPa
Stress	Young's Modulus	0,0000001 GPa
	Poisson's Ratio	0 ul
	Shear Modulus	0,00000005 GPa
Part Name(s)	Skeleton0003	

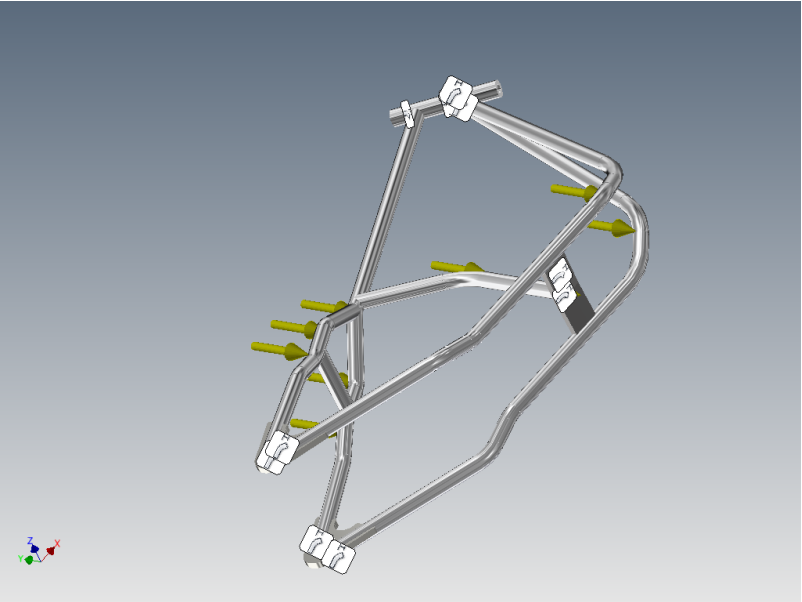
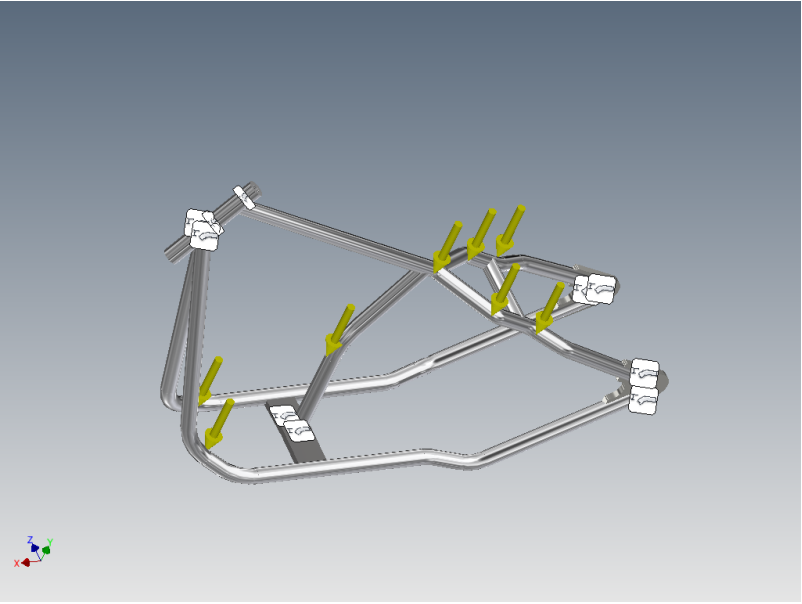
Operating conditions

Gravity

Load Type	Gravity
Magnitude	9810,000 mm/s ²
Vector X	-0,000 mm/s ²
Vector Y	-9810,000 mm/s ²

Vector Z 0,000 mm/s^2

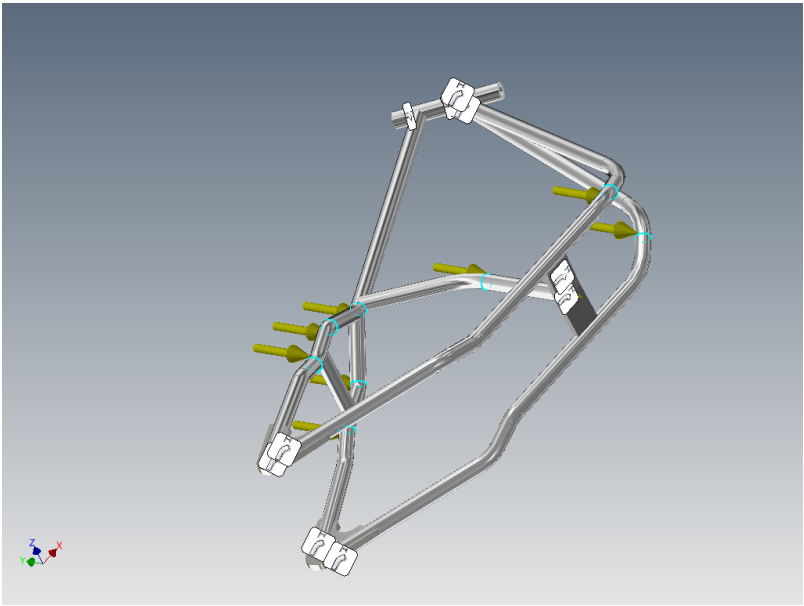
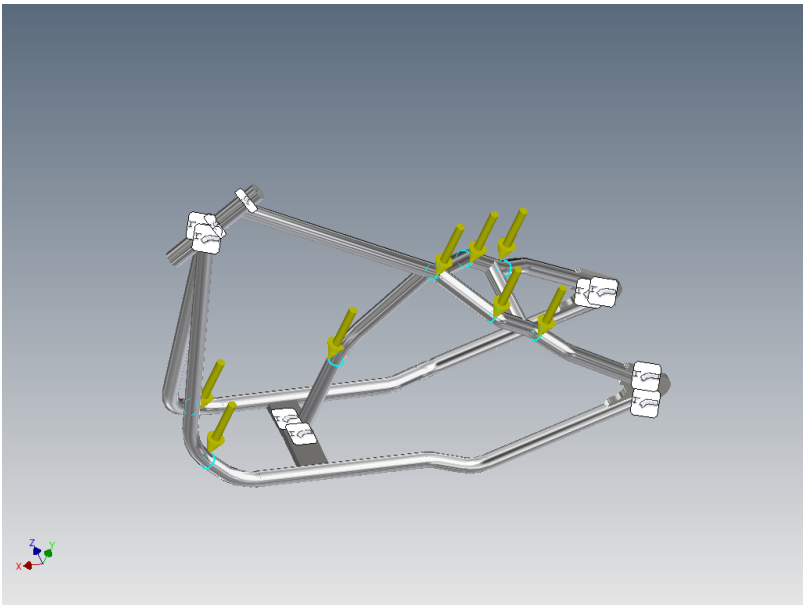
Selected Face(s)



Force:1

Load Type	Force
Magnitude	588,600 N
Vector X	-0,000 N
Vector Y	-588,600 N
Vector Z	0,000 N

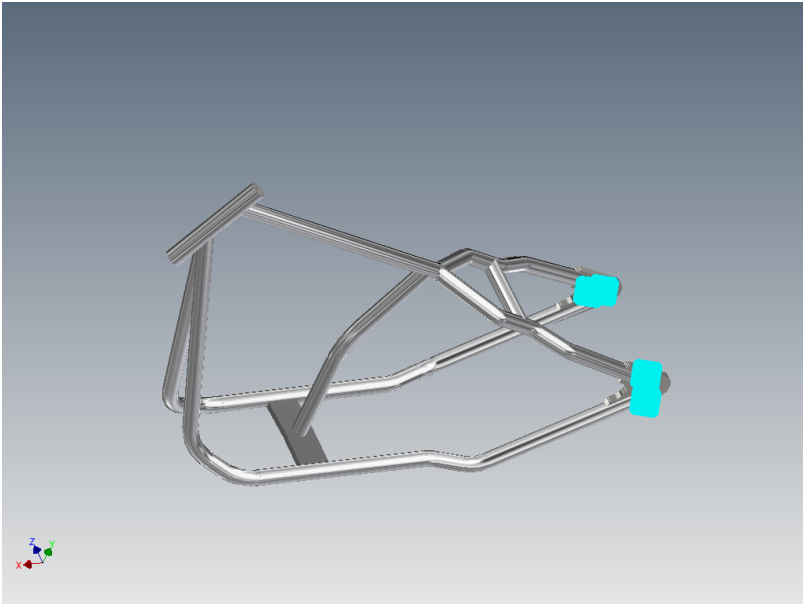
Selected Face(s)

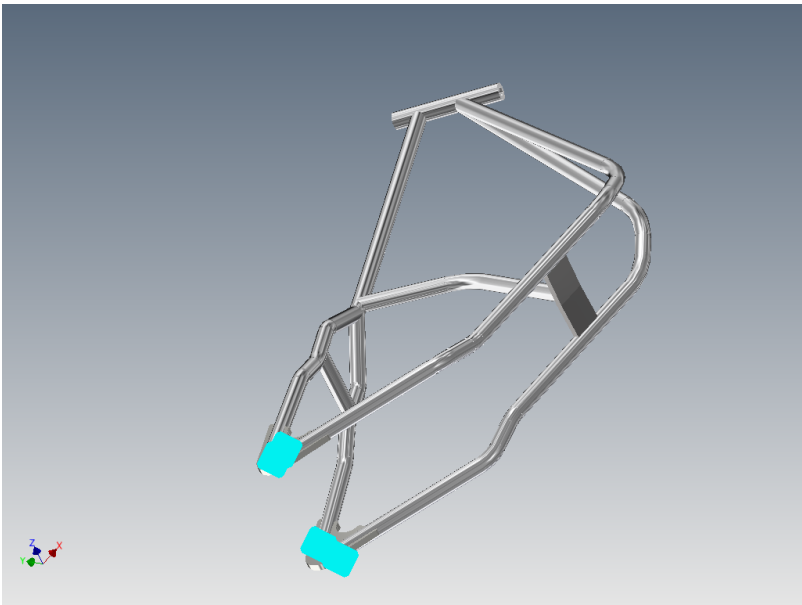


Fixed Constraint:1

Constraint Type Fixed Constraint

Selected Face(s)

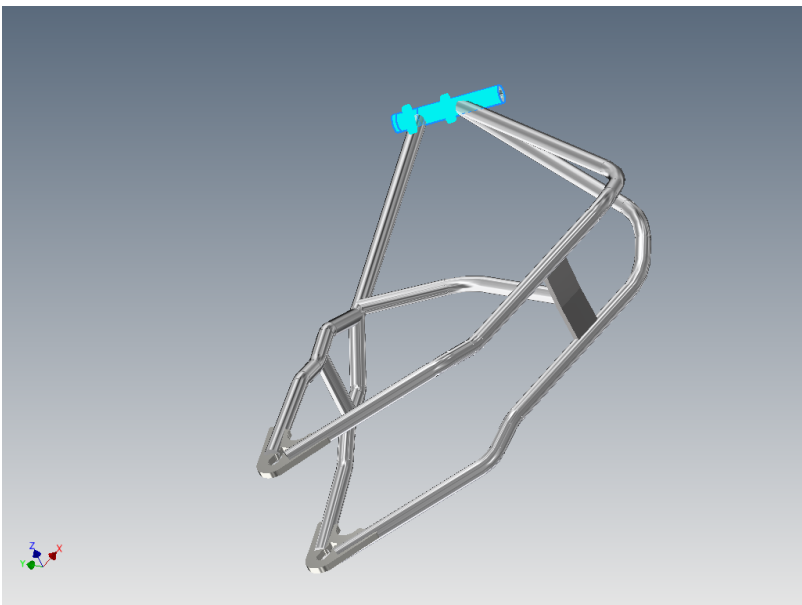
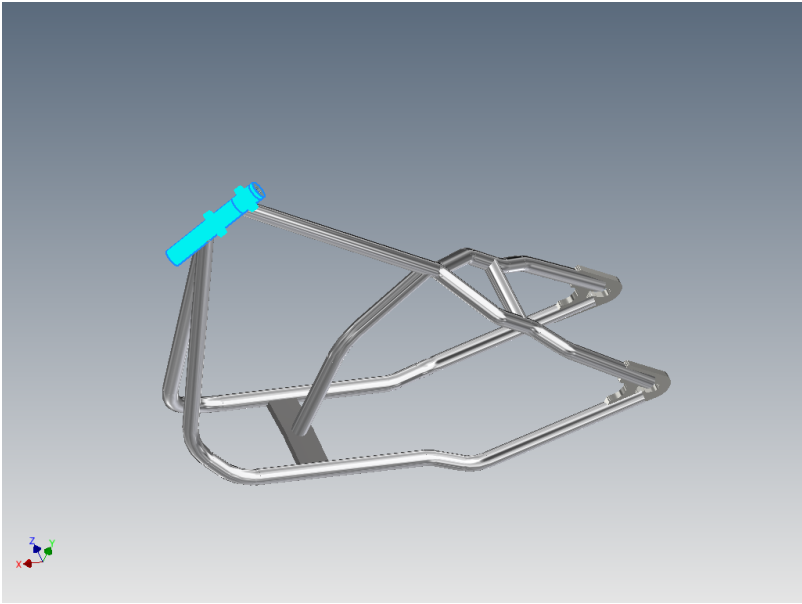




Fixed Constraint:2

Constraint Type Fixed Constraint

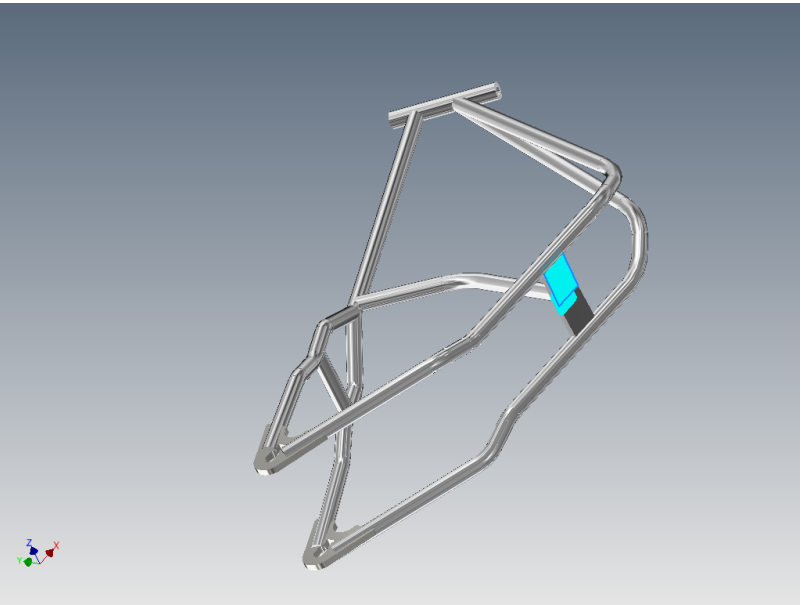
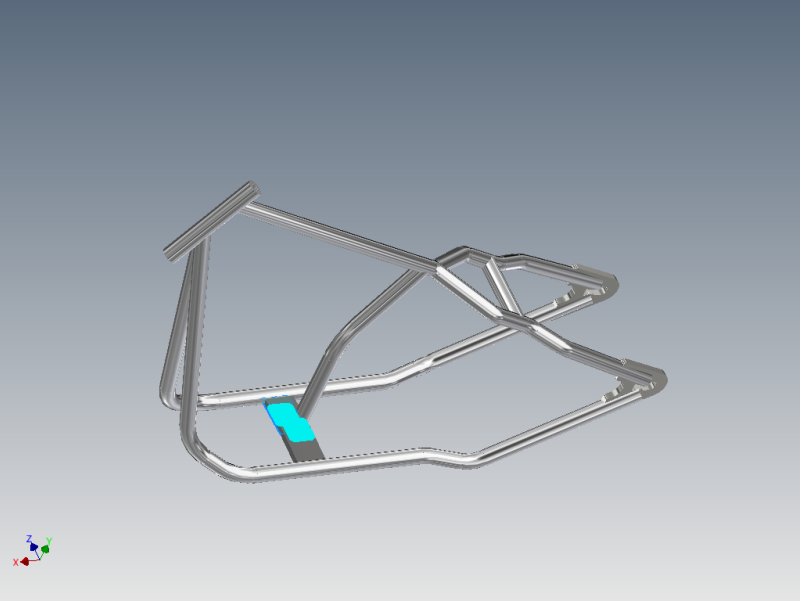
Selected Face(s)



Fixed Constraint:3

Constraint Type Fixed Constraint

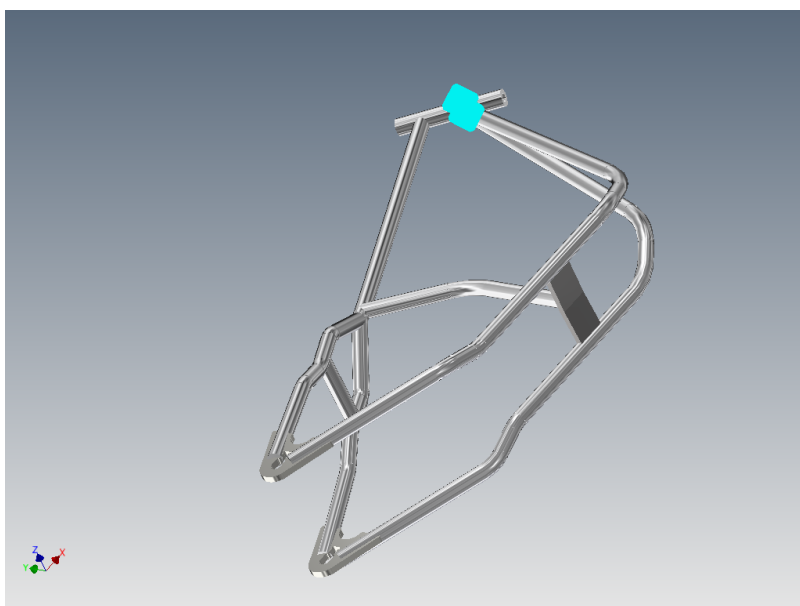
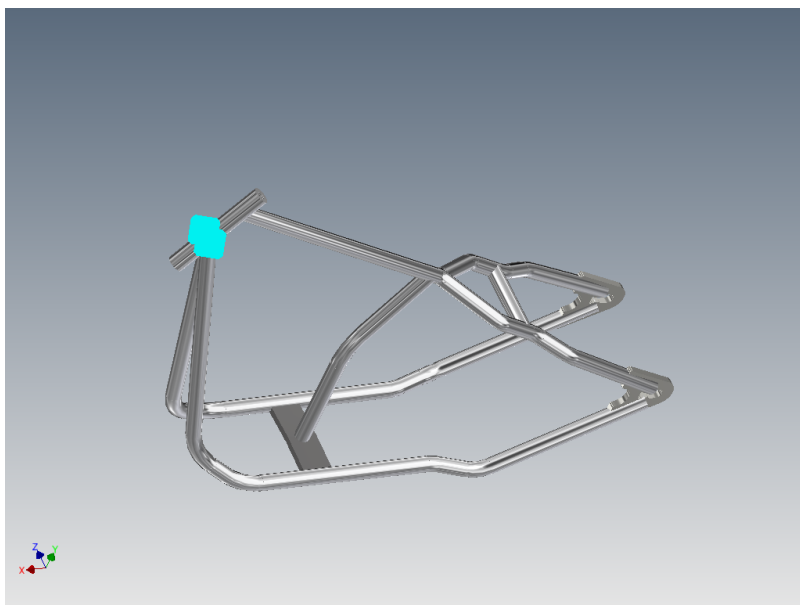
Selected Face(s)



Fixed Constraint:4

Constraint Type Fixed Constraint

Selected Face(s)



☐ Contacts (Bonded)

Name	Part Name(s)
Bonded:1	Frame0003:1/ISO 70x 15 00000019:1 Frame0003_MIR:1/ISO 70x 15 00000019_MIR:1
Bonded:2	Frame0003:1/ISO 70x 15 00000019:1 Frame0003:1/ISO D 36 x ID 16 00000045:1
Bonded:3	Frame0003:1/ISO D 36 x ID 16 00000008:1 Frame0003:1/ISO D 36 x ID 16 00000009:1
Bonded:4	Frame0003:1/ISO D 36 x ID 16 00000006:1 Frame0003:1/ISO D 36 x ID 16 00000007:1
Bonded:5	Frame0003:1/ISO D 36 x ID 16 00000013:1 Frame0003:1/ISO D 36 x ID 16 00000014:1
Bonded:6	Frame0003:1/ISO D 36 x ID 16 00000001:1 Frame0003:1/ISO D 36 x ID 16 00000002:1
Bonded:7	Frame0003:1/ISO D 36 x ID 16 00000004:1 Frame0003:1/ISO D 36 x ID 16 00000005:1
Bonded:8	Frame0003:1/ISO D 36 x ID 16 00000001:1 Frame0003:1/ISO D 36 x ID 20 00000020:1
Bonded:9	Frame0003:1/ISO D 36 x ID 16 00000002:1 Frame0003:1/ISO D 36 x ID 16 00000005:1
Bonded:10	Frame0003:1/ISO D 36 x ID 16 00000046:1 Frame0003:1/ISO D 36 x ID 16 00000047:1
Bonded:11	Frame0003:1/ISO D 36 x ID 16 00000011:1 Frame0003:1/ISO D 36 x ID 16 00000012:1
Bonded:12	Frame0003:1/ISO D 36 x ID 16 00000015:1 Frame0003:1/ISO D 36 x ID 16 00000016:1

Bonded:13	Frame0003:1/ISO D 36 x ID 16 00000017:1 Frame0003:1/ISO D 36 x ID 16 00000018:1
Bonded:14	Frame0003:1/ISO D 36 x ID 16 00000045:1 Frame0003:1/ISO D 36 x ID 16 00000046:1
Bonded:15	Frame0003:1/ISO D 36 x ID 16 00000003:1 Frame0003:1/ISO D 36 x ID 16 00000006:1
Bonded:16	Frame0003:1/ISO D 36 x ID 20 00000020:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000001_MIR:1
Bonded:17	Frame0003:1/ISO D 36 x ID 16 00000010:1 Frame0003:1/ISO D 36 x ID 16 00000011:1
Bonded:18	Frame0003:1/ISO D 36 x ID 16 00000014:1 Frame0003:1/ISO D 36 x ID 16 00000015:1
Bonded:19	Frame0003:1/ISO D 36 x ID 16 00000001:1 Frame0003:1/ISO D 36 x ID 16 00000047:1
Bonded:20	Frame0003:1/ISO D 36 x ID 16 00000016:1 Frame0003:1/ISO D 36 x ID 16 00000017:1
Bonded:21	Frame0003:1/ISO D 40 x ID 20 00000038:1 Frame0003:1/ISO D 40 x ID 20 00000043:1
Bonded:22	Frame0003:1/ISO D 36 x ID 16 00000004:1 Frame0003:1/ISO D 36 x ID 16 00000006:1
Bonded:23	Frame0003:1/ISO D 36 x ID 16 00000007:1 Frame0003:1/ISO D 36 x ID 16 00000008:1
Bonded:24	Frame0003:1/ISO D 36 x ID 16 00000012:1 Frame0003:1/ISO D 36 x ID 16 00000013:1
Bonded:25	Frame0003:1/ISO D 36 x ID 16 00000045:1 Frame0003_MIR:1/ISO 70x 15 00000019_MIR:1
Bonded:26	Frame0003:1/ISO D 36 x ID 20 00000020:1 Frame0003:1/ISO D 40 x ID 20 00000043:1
Bonded:27	Frame0003:1/ISO D 36 x ID 20 00000020:1 Frame0003:1/ISO D 40 x ID 20 00000038:1
Bonded:28	Frame0003:1/ISO D 36 x ID 16 00000003:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000003_MIR:1
Bonded:29	Frame0003:1/ISO D 36 x ID 16 00000047:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000001_MIR:1
Bonded:30	Frame0003:1/ISO D 36 x ID 16 00000003:1 Frame0003:1/ISO D 36 x ID 16 00000006:1
Bonded:31	Frame0003:1/ISO D 36 x ID 16 00000014:1 Frame0003:1/ISO 70x 15 00000019:1
Bonded:32	Frame0003:1/ISO D 36 x ID 16 00000014:1 Frame0003:1/ISO 70x 15 00000019:1
Bonded:33	Frame0003:1/ISO D 36 x ID 16 00000003:1 Frame0003:1/ISO D 36 x ID 16 00000004:1
Bonded:35	Frame0003_MIR:1/ISO D 36 x ID 16 00000004_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000005_MIR:1
Bonded:36	Frame0003_MIR:1/ISO D 36 x ID 16 00000006_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000007_MIR:1
Bonded:37	Frame0003_MIR:1/ISO D 36 x ID 16 00000008_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000009_MIR:1
Bonded:38	Frame0003_MIR:1/ISO D 36 x ID 16 00000013_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000014_MIR:1
Bonded:39	Frame0003_MIR:1/ISO D 36 x ID 16 00000001_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000002_MIR:1
Bonded:40	Frame0003_MIR:1/ISO D 36 x ID 16 00000002_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000005_MIR:1
Bonded:41	Frame0003_MIR:1/ISO D 36 x ID 16 00000003_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000006_MIR:1
Bonded:42	Frame0003_MIR:1/ISO D 36 x ID 16 00000017_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000018_MIR:1
Bonded:43	Frame0003_MIR:1/ISO D 36 x ID 16 00000010_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000011_MIR:1
Bonded:44	Frame0003_MIR:1/ISO D 36 x ID 16 00000011_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000012_MIR:1
Bonded:45	Frame0003_MIR:1/ISO D 36 x ID 16 00000014_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000015_MIR:1
Bonded:46	Frame0003_MIR:1/ISO D 36 x ID 16 00000015_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000016_MIR:1
Bonded:47	Frame0003_MIR:1/ISO D 36 x ID 16 00000016_MIR:1

	Frame0003_MIR:1/ISO D 36 x ID 16 00000017_MIR:1
Bonded:48	Frame0003_MIR:1/ISO D 36 x ID 16 00000007_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000008_MIR:1
Bonded:49	Frame0003_MIR:1/ISO D 36 x ID 16 00000004_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000006_MIR:1
Bonded:50	Frame0003_MIR:1/ISO D 36 x ID 16 00000012_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000013_MIR:1
Bonded:51	Frame0003_MIR:1/ISO D 36 x ID 16 00000003_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000006_MIR:1
Bonded:52	Frame0003_MIR:1/ISO D 36 x ID 16 00000003_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000004_MIR:1
Bonded:53	Frame0003_MIR:1/ISO D 36 x ID 16 00000014_MIR:1 Frame0003_MIR:1/ISO 70x 15 00000019_MIR:1
Bonded:54	Frame0003:1/ISO D 36 x ID 16 00000009:1 ass plate:1
Bonded:55	Frame0003:1/ISO D 36 x ID 16 00000010:1 ass plate:1
Bonded:56	Frame0003:1/ISO D 36 x ID 16 00000009:1 ass plate:1
Bonded:57	Frame0003_MIR:1/ISO D 36 x ID 16 00000009_MIR:1 ass plate:2
Bonded:58	Frame0003_MIR:1/ISO D 36 x ID 16 00000010_MIR:1 ass plate:2
Bonded:59	Frame0003_MIR:1/ISO D 36 x ID 16 00000009_MIR:1 ass plate:2
[M]: Bonded:34	Frame0003:1/ISO D 36 x ID 16 00000047:1 Frame0003:1/ISO D 36 x ID 20 00000020:1
[M]: Bonded:60	Frame0003_MIR:1/ISO D 36 x ID 16 00000018_MIR:1 Frame0003:1/ISO D 40 x ID 20 00000043:1
[M]: Bonded:61	Frame0003_MIR:1/ISO D 36 x ID 16 00000018_MIR:1 Frame0003:1/ISO D 36 x ID 16 00000018:1
[M]: Bonded:62	Frame0003:1/ISO D 40 x ID 20 00000043:1 Frame0003:1/ISO D 36 x ID 16 00000018:1
[M]: Bonded:63	Frame0003_MIR:1/ISO 70x 15 00000019_MIR:1 Frame0003_MIR:1/ISO D 36 x ID 16 00000014_MIR:1
[M]: Bonded:64	Frame0003:1/ISO 70x 15 00000019:1 Frame0003:1/ISO D 36 x ID 16 00000014:1
[M]: Bonded:65	Frame0003_MIR:1/ISO D 36 x ID 16 00000014_MIR:1 Frame0003_MIR:1/ISO 70x 15 00000019_MIR:1
[M]: Bonded:66	Frame0003:1/ISO D 36 x ID 16 00000014:1 Frame0003:1/ISO 70x 15 00000019:1
[M]: Bonded:67	Frame0003:1/ISO D 40 x ID 20 00000043:1 Frame0003:1/ISO D 36 x ID 20 00000020:1
[M]: Bonded:68	ass plate:2 Frame0003_MIR:1/ISO D 36 x ID 16 00000009_MIR:1
[M]: Bonded:69	ass plate:1 Frame0003:1/ISO D 36 x ID 16 00000009:1

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	318,784 N	-59,3121 N	31,4834 N m	1,30118 N m
		313,211 N		3,61631 N m
		-1,96526 N		31,248 N m
Fixed Constraint:2	73,0229 N	53,5482 N	3,09539 N m	0,0277617 N m
		49,6466 N		-0,194493 N m
		-0,387037 N		-3,08915 N m
Fixed Constraint:3	440,118 N	-50,6019 N	25,1398 N m	18,8401 N m
		437,198 N		0,929031 N m
		0,974316 N		16,6192 N m
Fixed Constraint:4	235,945 N	56,3525 N	0,111942 N m	0,0908058 N m
		229,113 N		-0,0638637 N m

1,20995 N

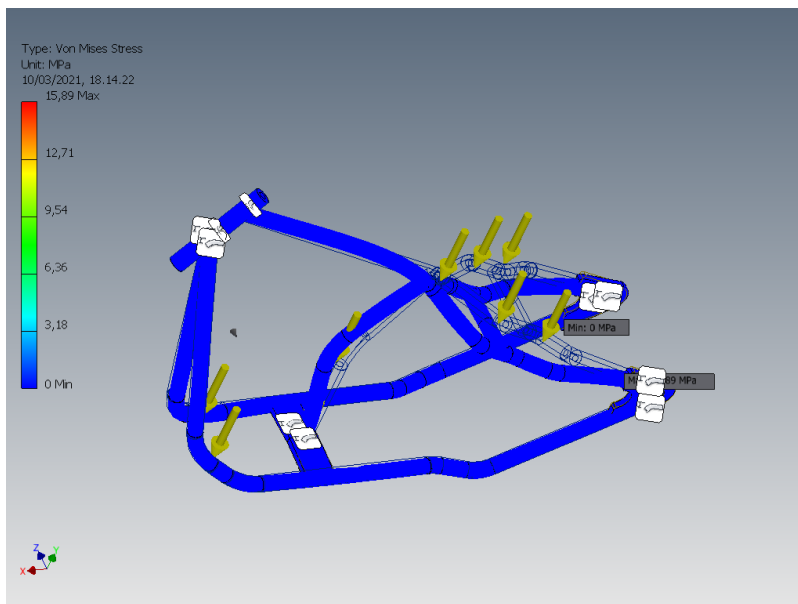
0,0143804 N m

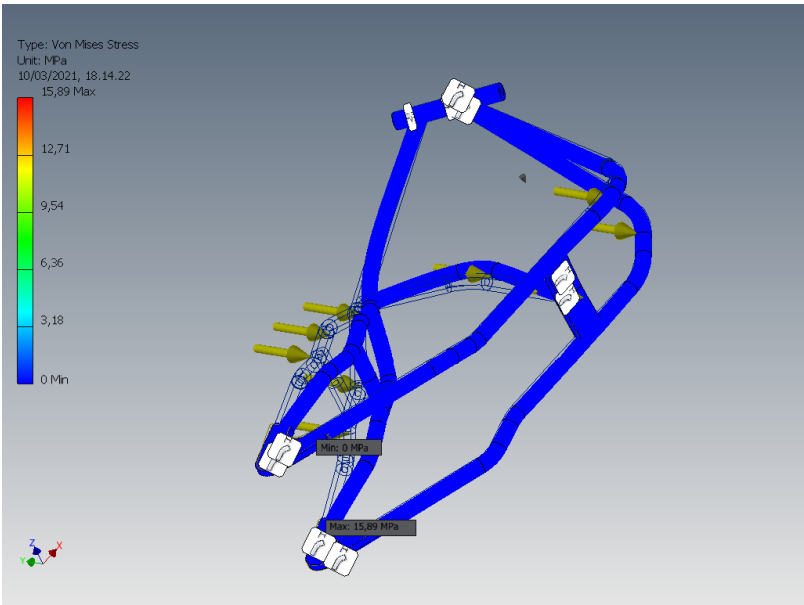
Result Summary

Name	Minimum	Maximum
Volume	6091210 mm ³	
Mass	47,816 kg	
Von Mises Stress	0,0000125925 MPa	15,8937 MPa
1st Principal Stress	-0,54859 MPa	12,264 MPa
3rd Principal Stress	-7,84814 MPa	0,500043 MPa
Displacement	0 mm	5,61587 mm
Safety Factor	15 ul	15 ul
Stress XX	-5,20605 MPa	10,4746 MPa
Stress XY	-3,69157 MPa	3,1719 MPa
Stress XZ	-1,48923 MPa	1,3404 MPa
Stress YY	-6,96026 MPa	8,23217 MPa
Stress YZ	-7,28727 MPa	0,920933 MPa
Stress ZZ	-2,40241 MPa	3,14748 MPa
X Displacement	-0,0481062 mm	0,0468996 mm
Y Displacement	-5,61587 mm	0,00297345 mm
Z Displacement	-0,00620216 mm	0,00285681 mm
Equivalent Strain	0,000000000829359 ul	0,0000686031 ul
1st Principal Strain	-0,0000000241431 ul	0,0000703568 ul
3rd Principal Strain	-0,0000437687 ul	0,000000000135425 ul
Strain XX	-0,000019714 ul	0,0000473692 ul
Strain XY	-0,0000238106 ul	0,0000204588 ul
Strain XZ	-0,00000960554 ul	0,00000864556 ul
Strain YY	-0,0000350021 ul	0,0000443513 ul
Strain YZ	-0,0000470029 ul	0,00000594002 ul
Strain ZZ	-0,0000178556 ul	0,00000931352 ul
Contact Pressure	0 MPa	12,239 MPa
Contact Pressure X	-3,80238 MPa	4,12631 MPa
Contact Pressure Y	-6,7171 MPa	11,5883 MPa
Contact Pressure Z	-2,03193 MPa	3,91921 MPa

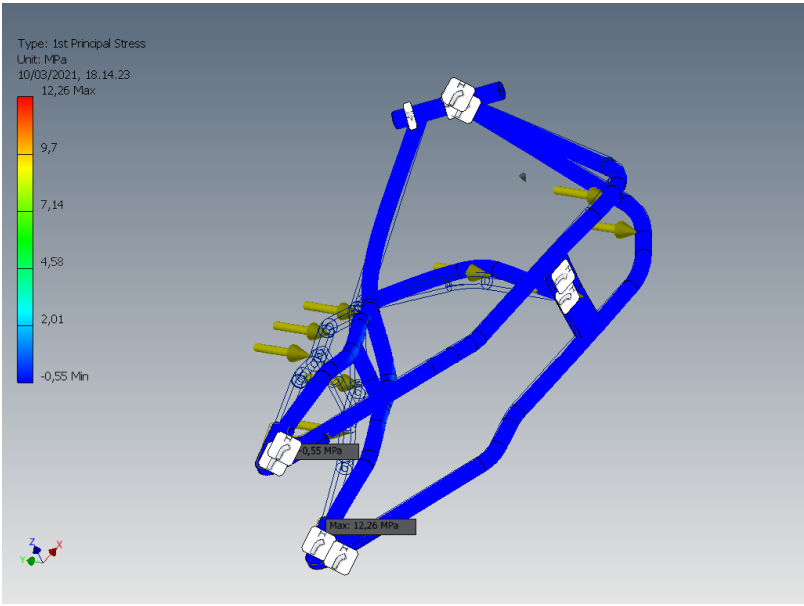
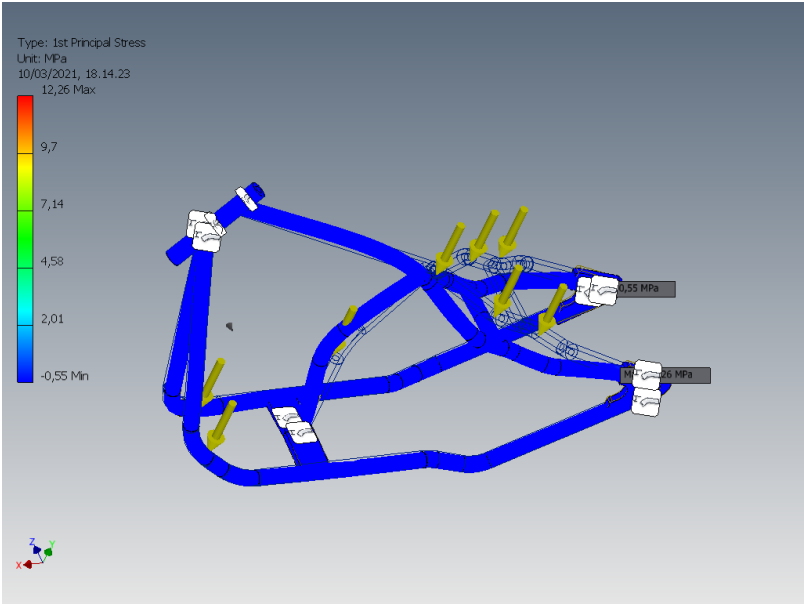
Figures

Von Mises Stress

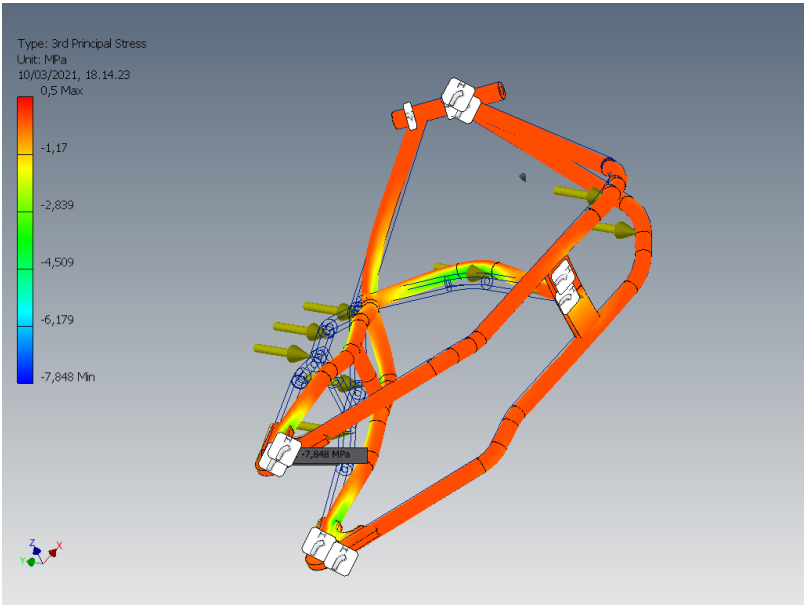
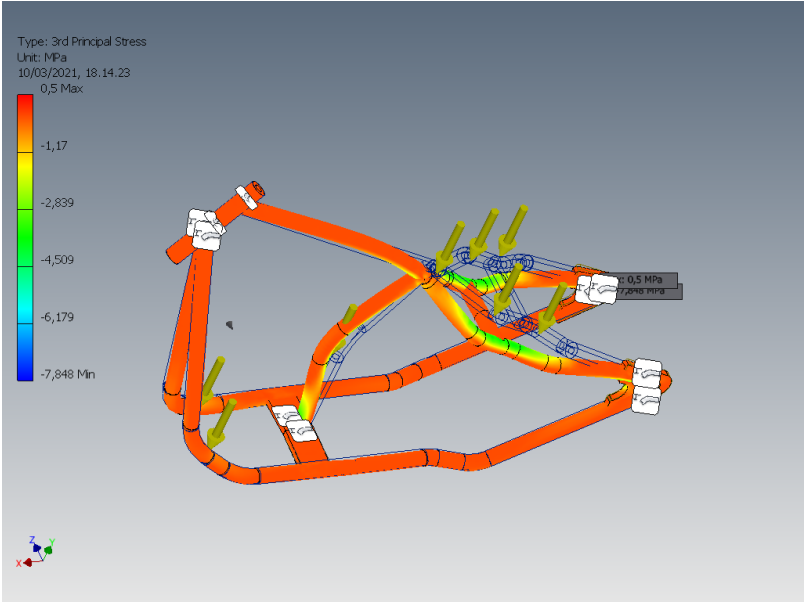




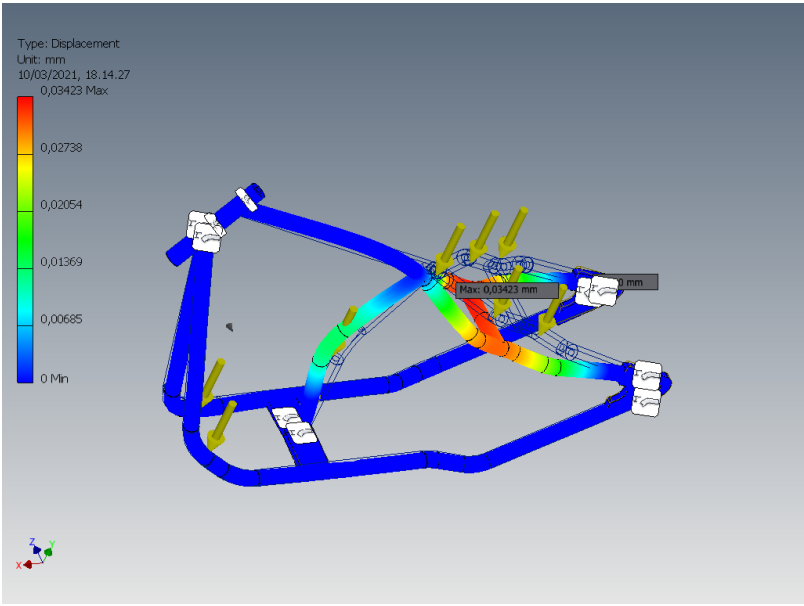
1st Principal Stress

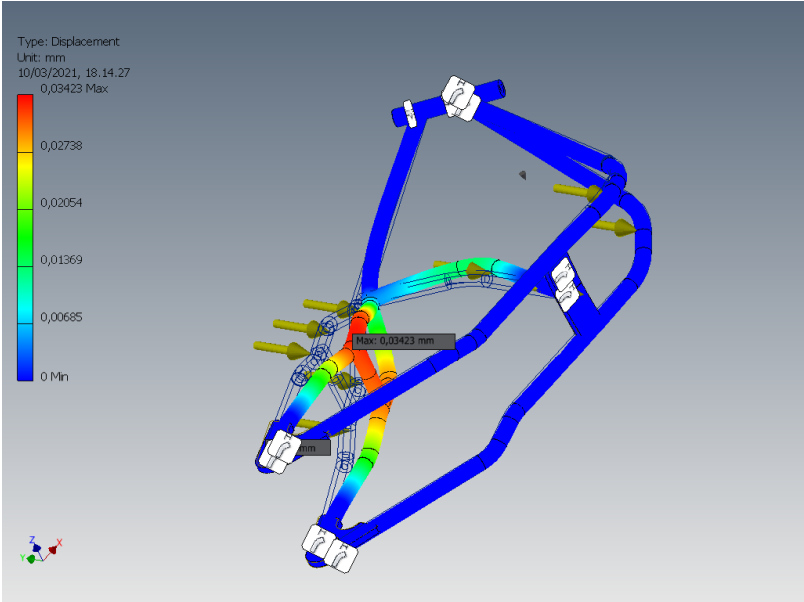


3rd Principal Stress

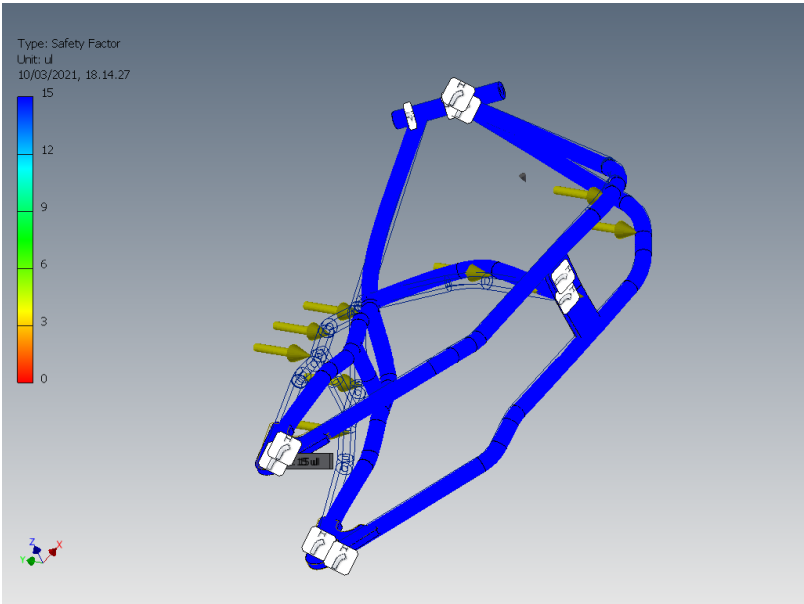
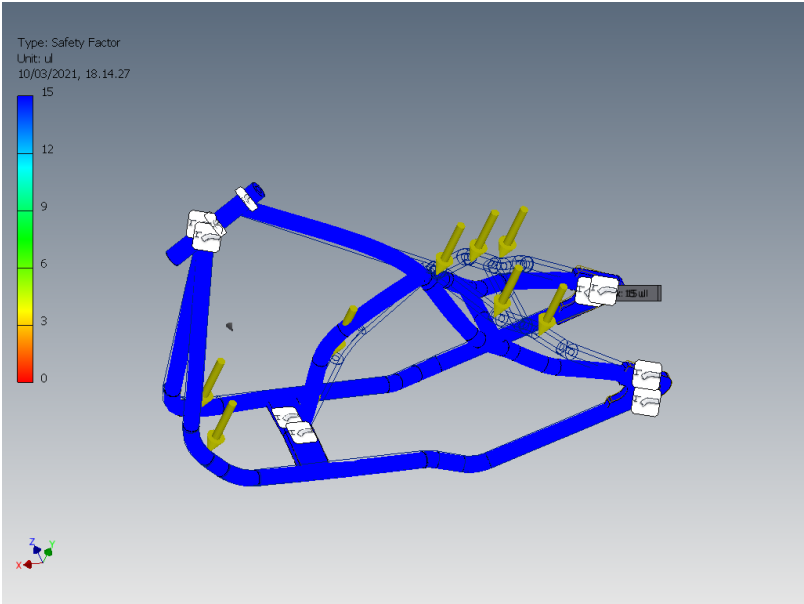


Displacement

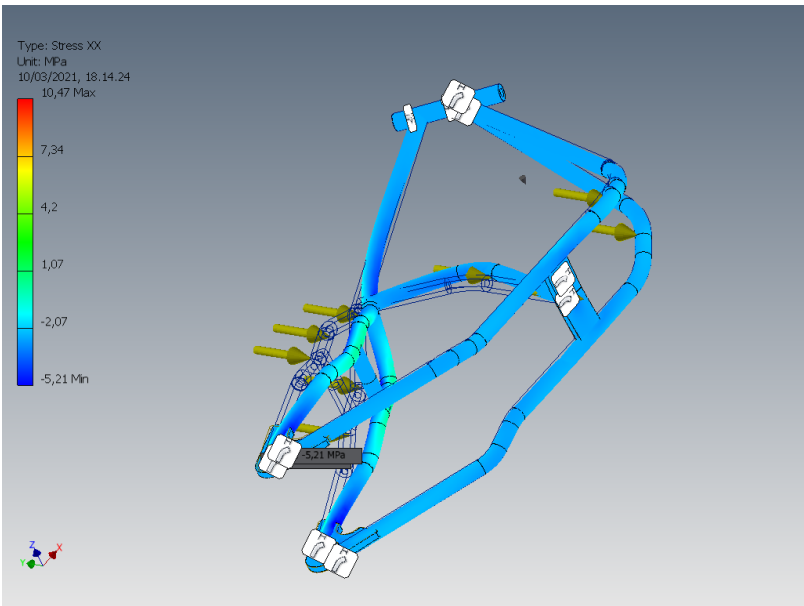
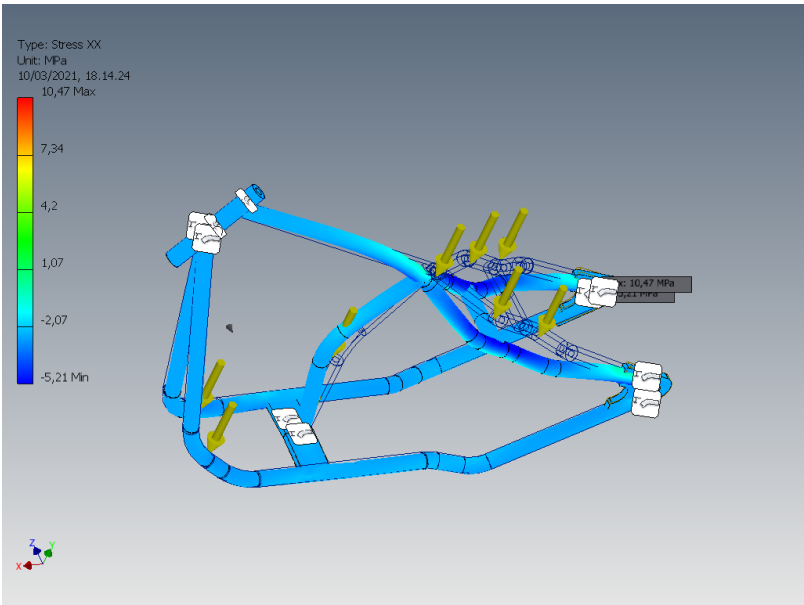




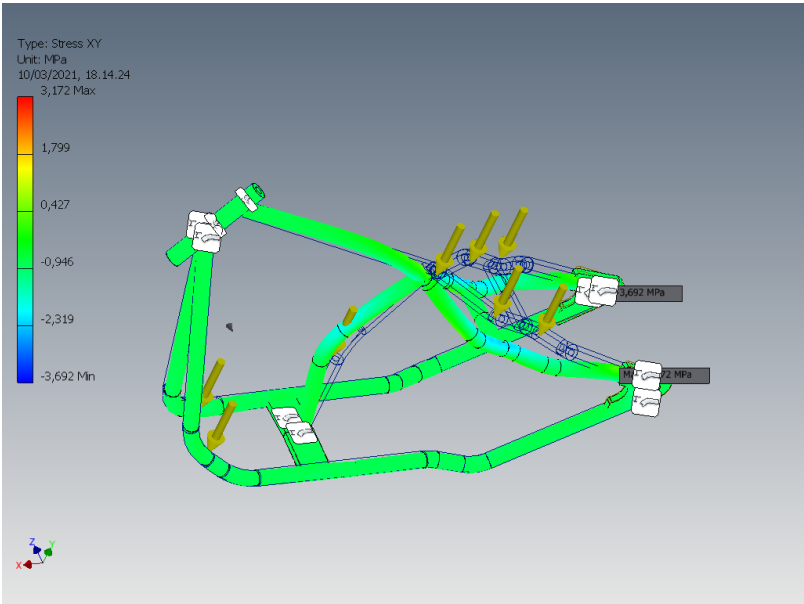
Safety Factor

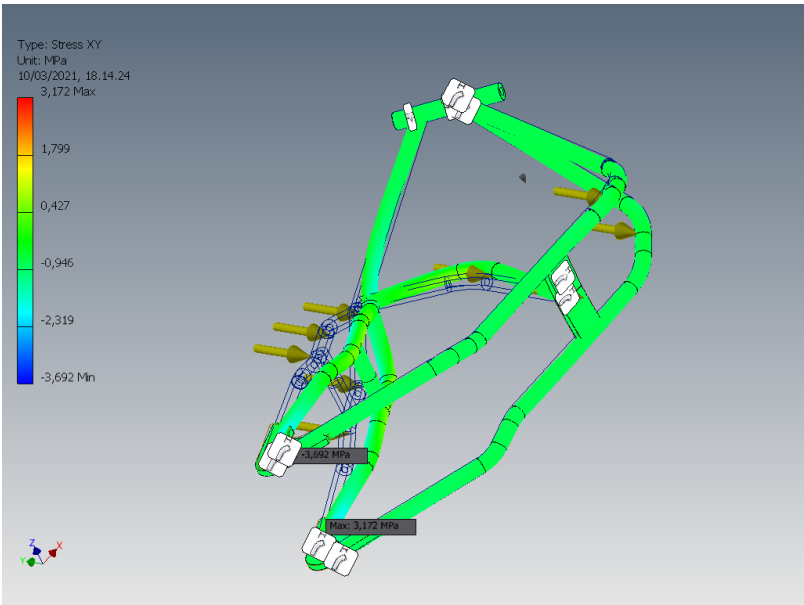


Stress XX

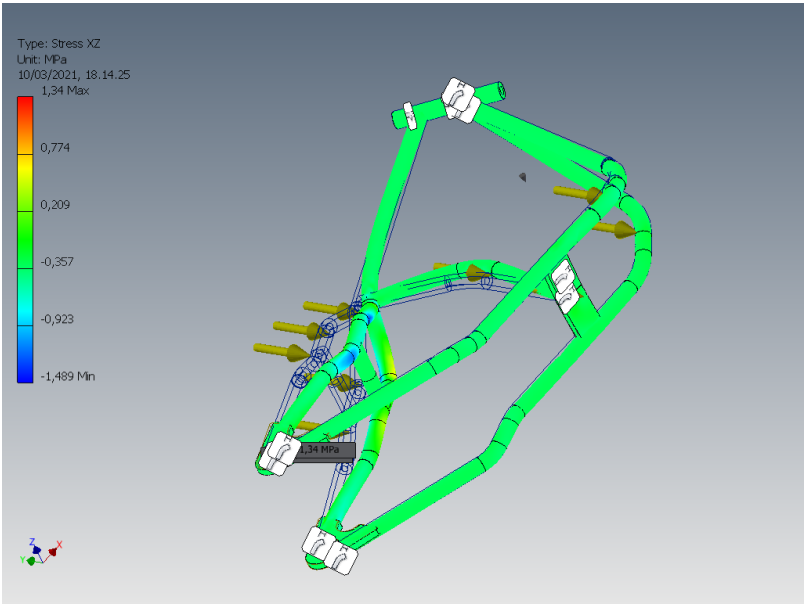
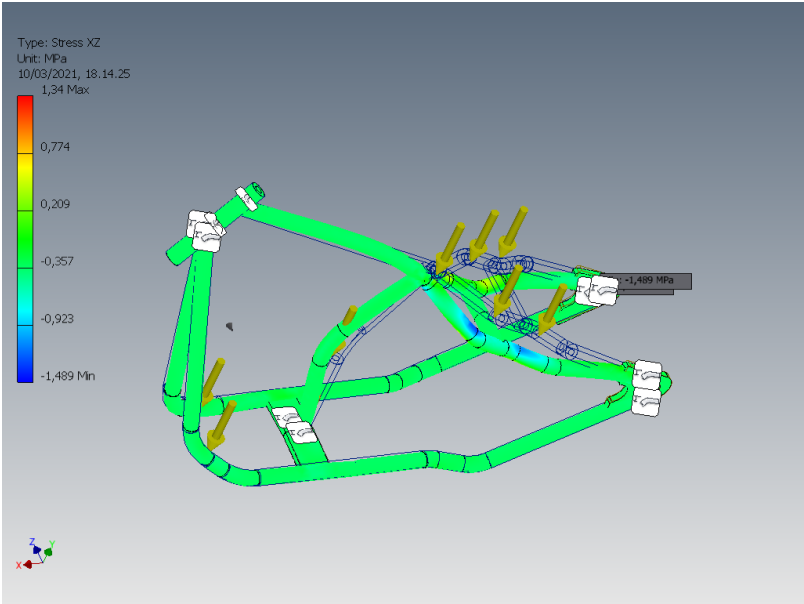


☐ Stress XY

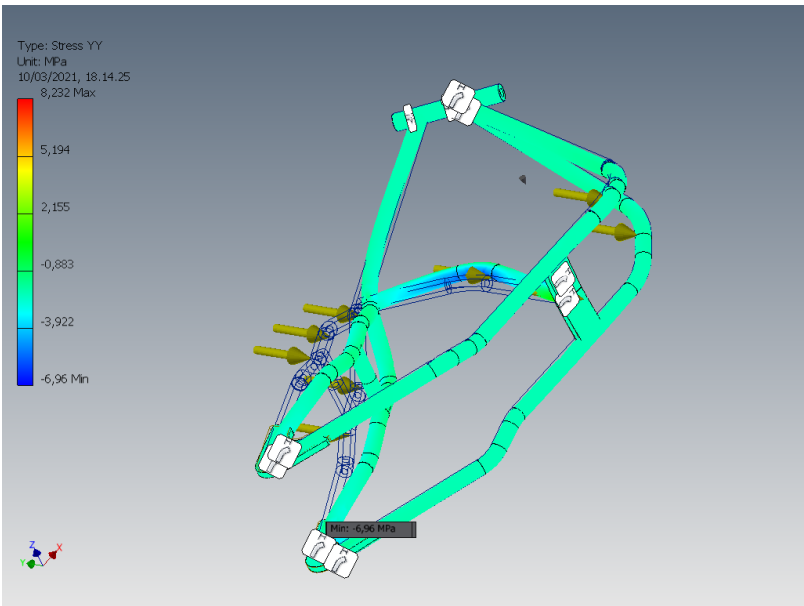
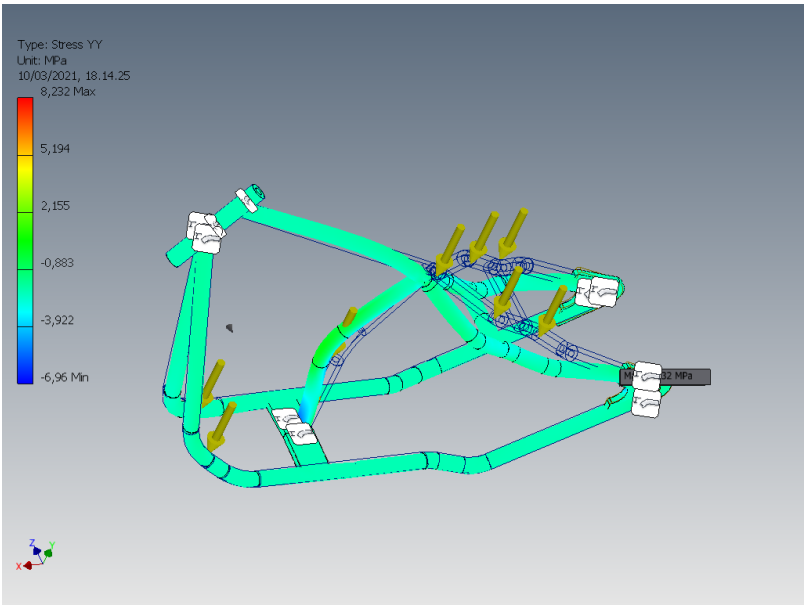




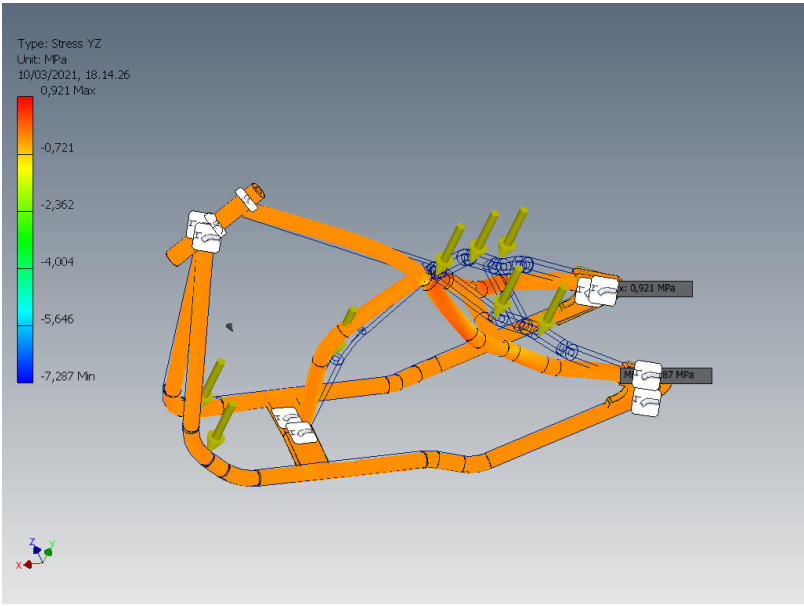
☐ Stress XZ

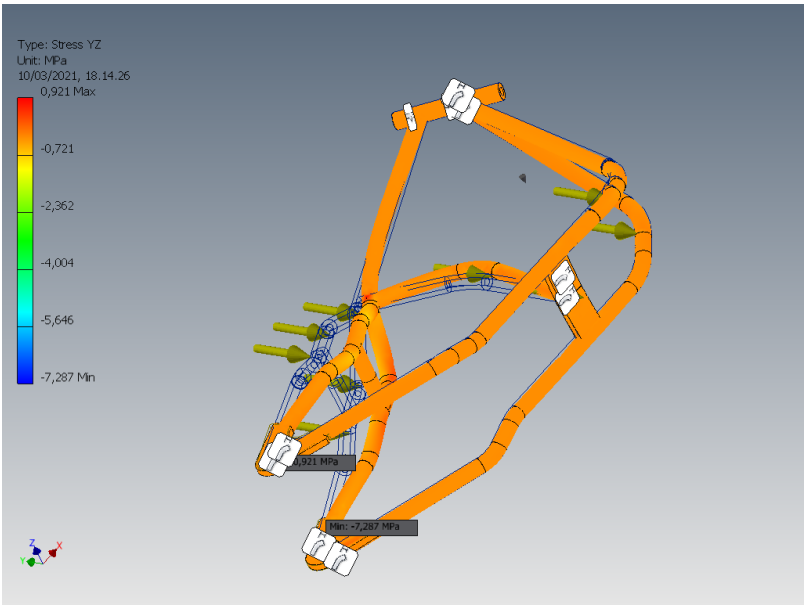


☐ Stress YY

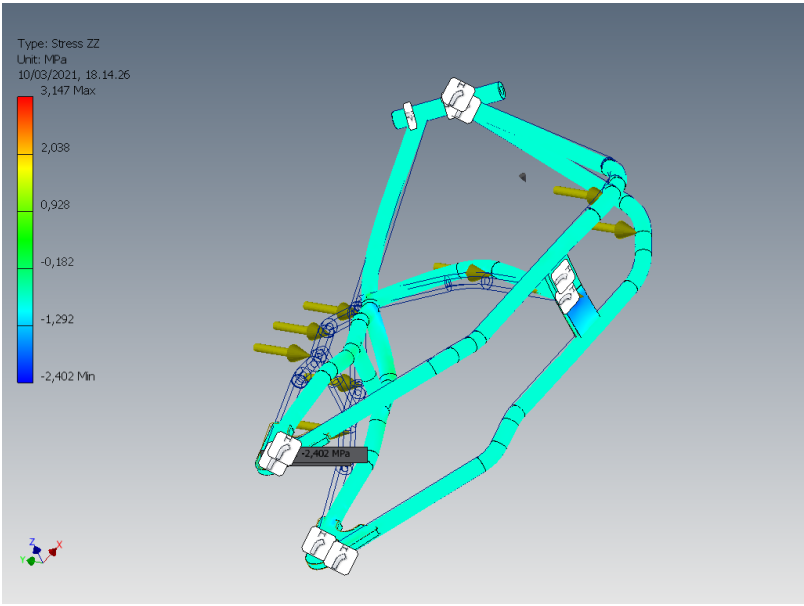
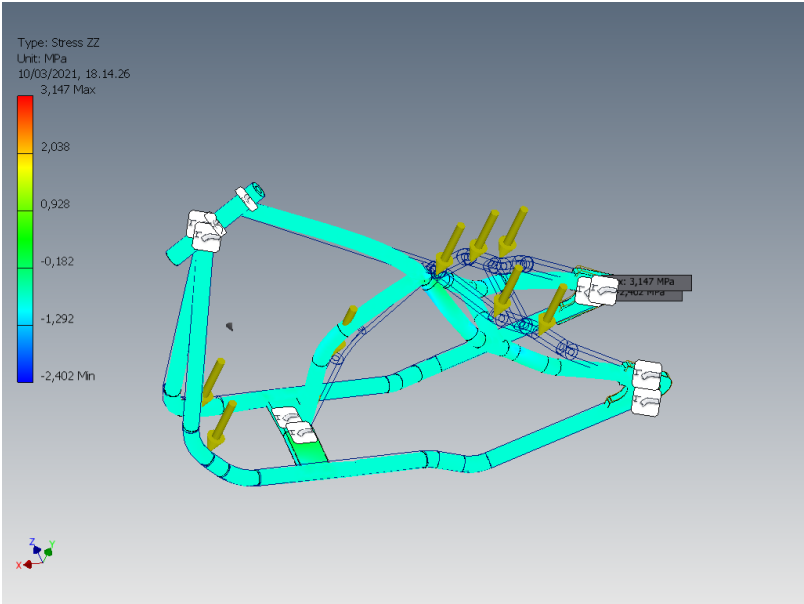


☐ Stress YZ

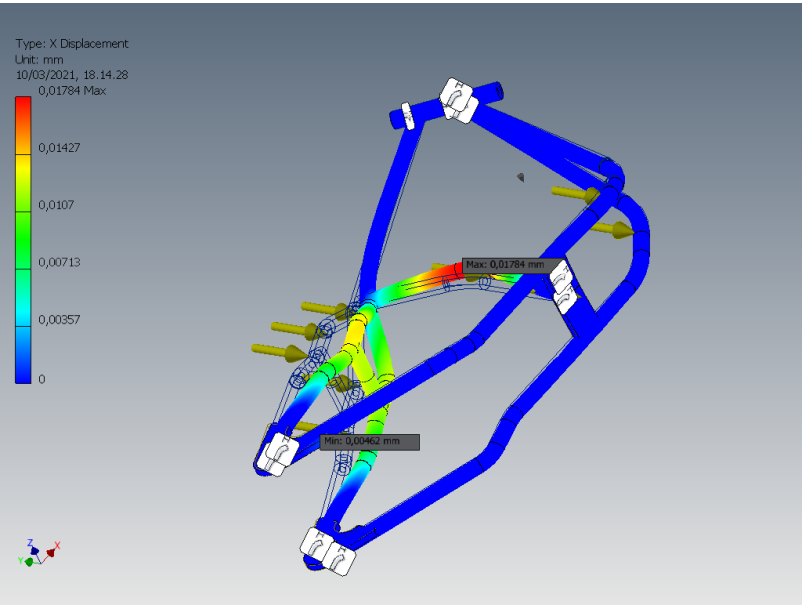
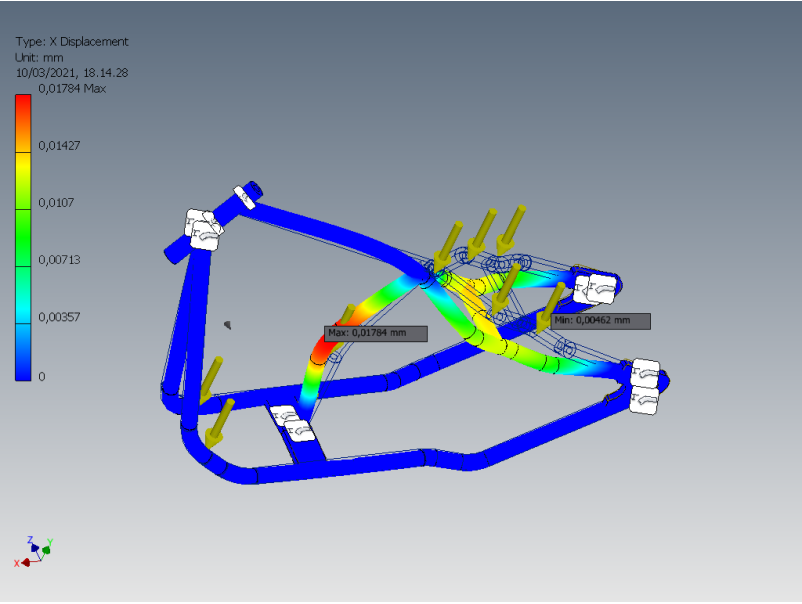




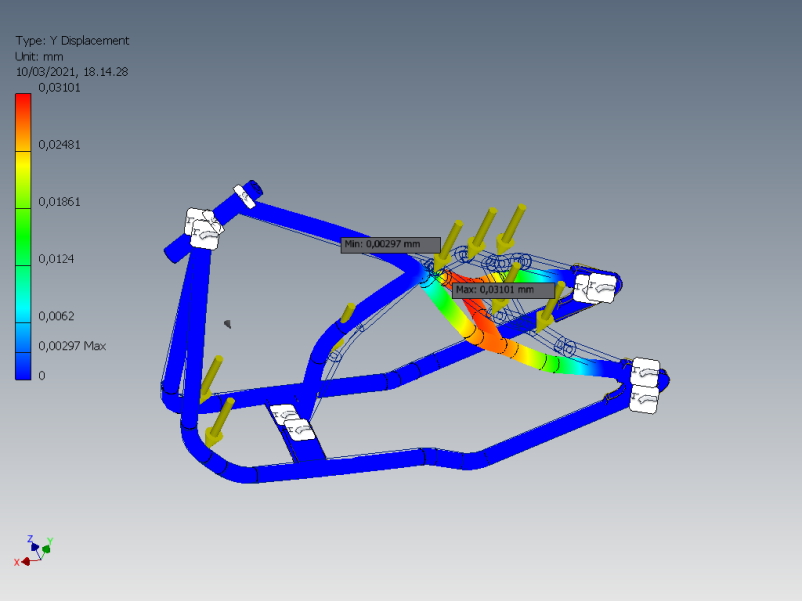
☐ Stress ZZ

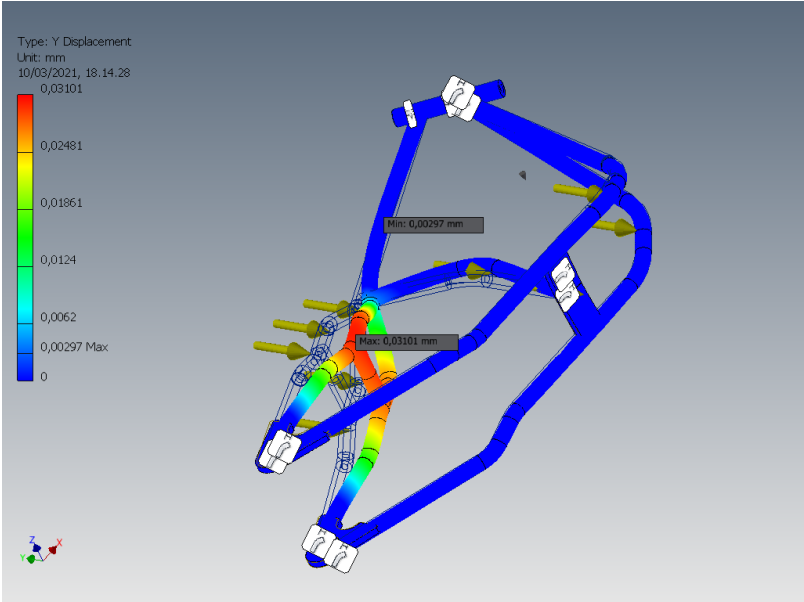


☐ X Displacement

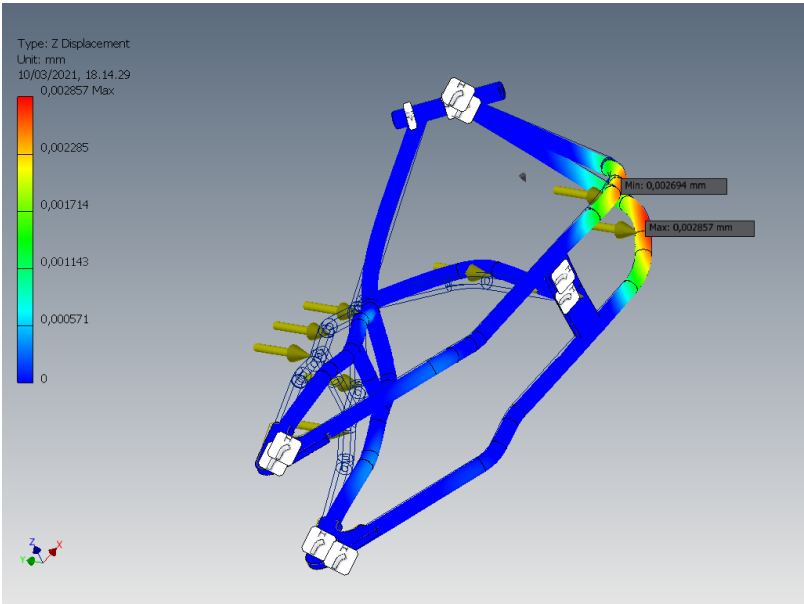
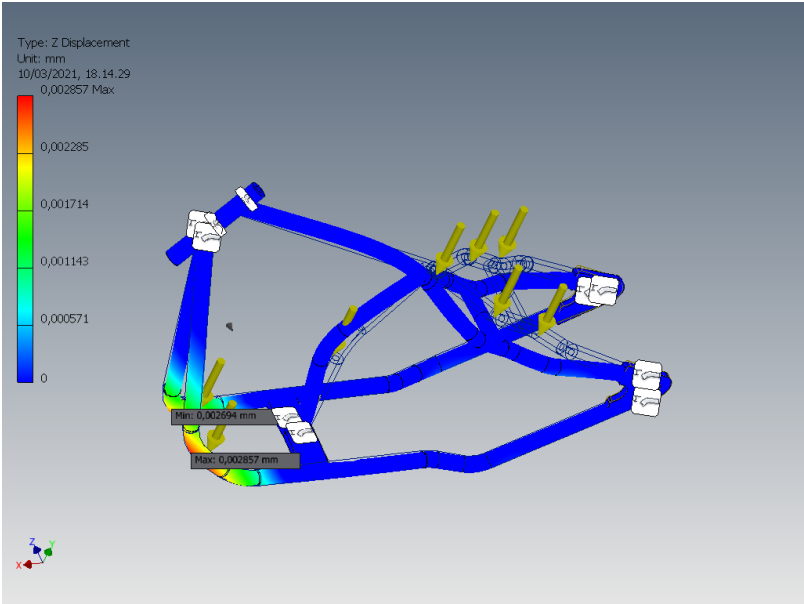


Y Displacement

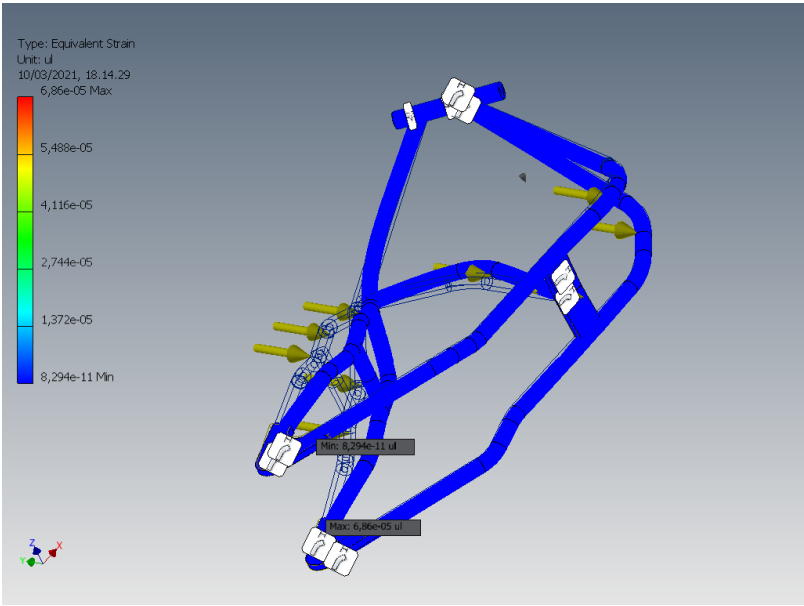
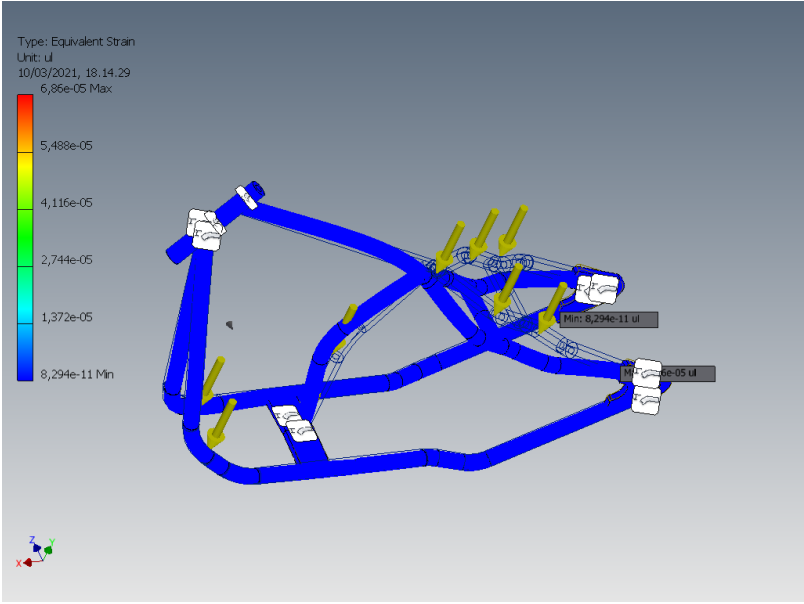




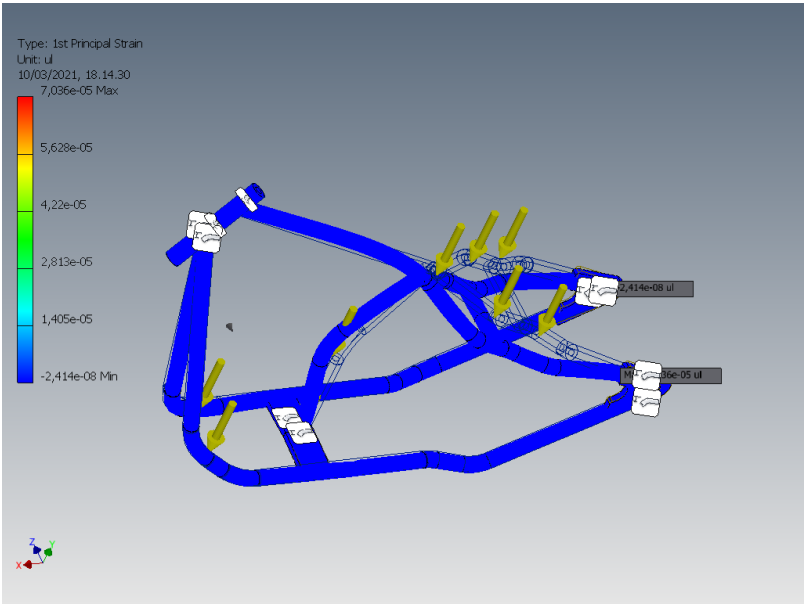
Z Displacement

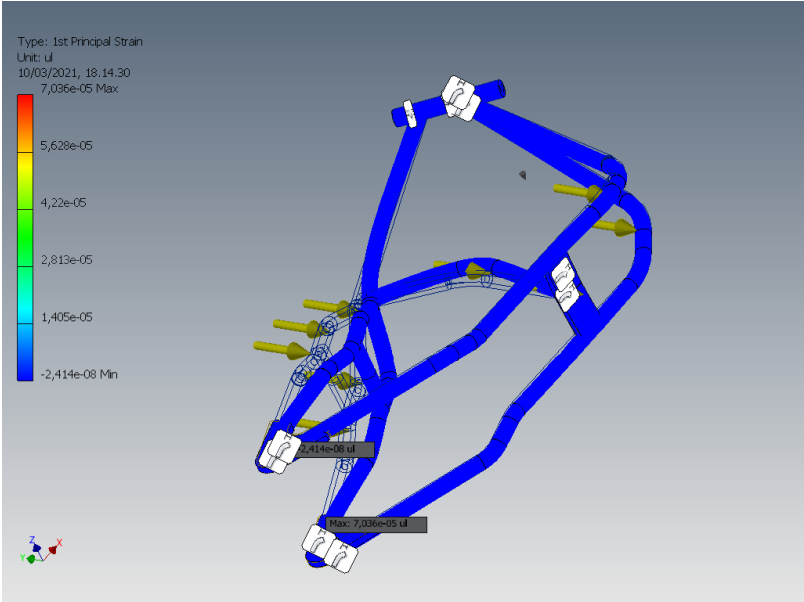


Equivalent Strain

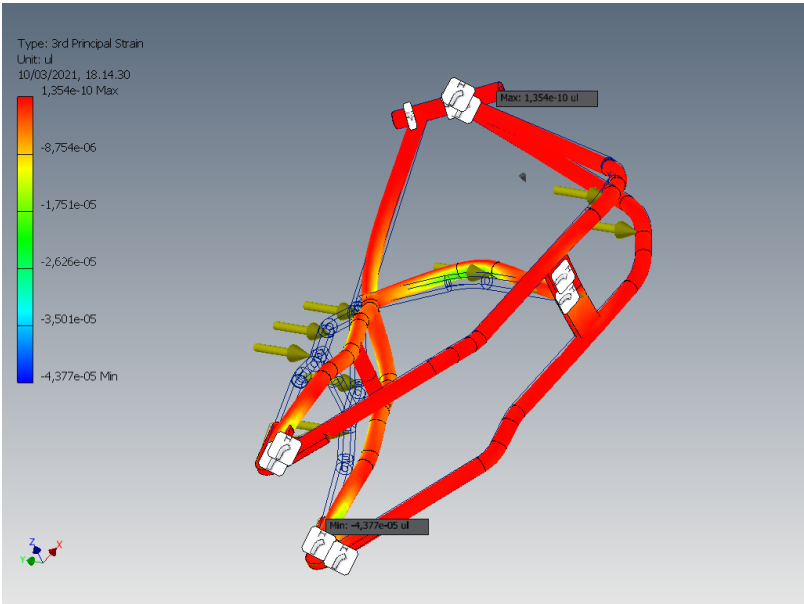
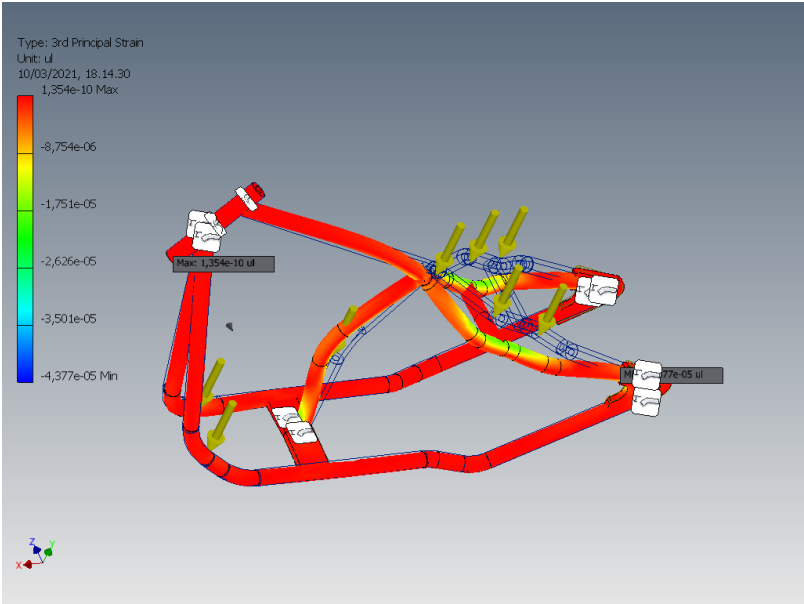


1st Principal Strain

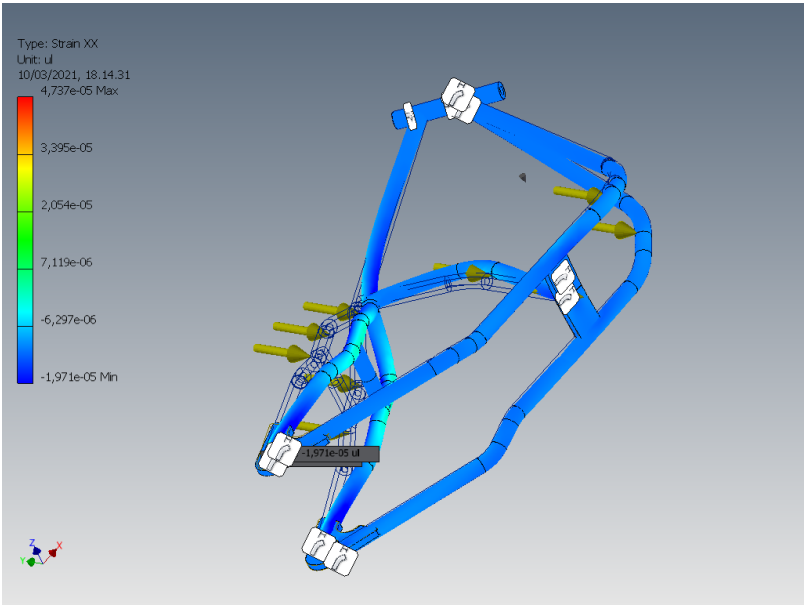
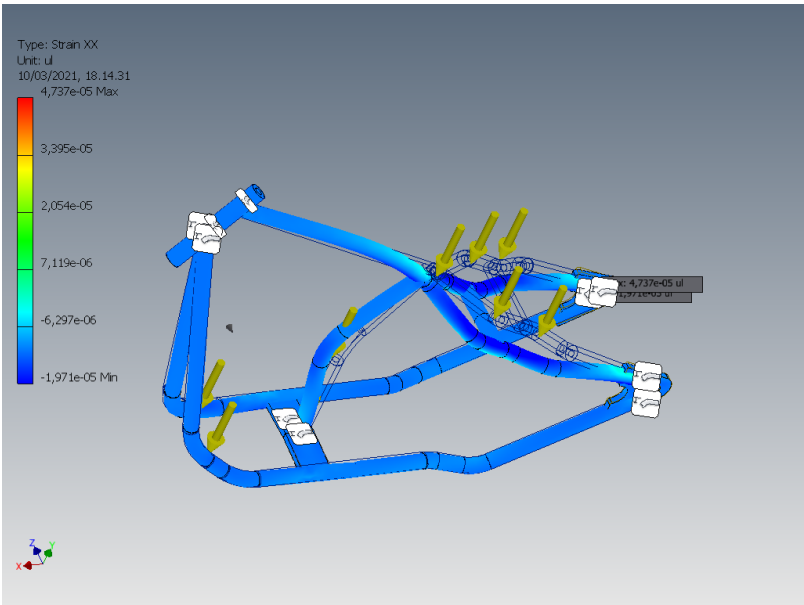




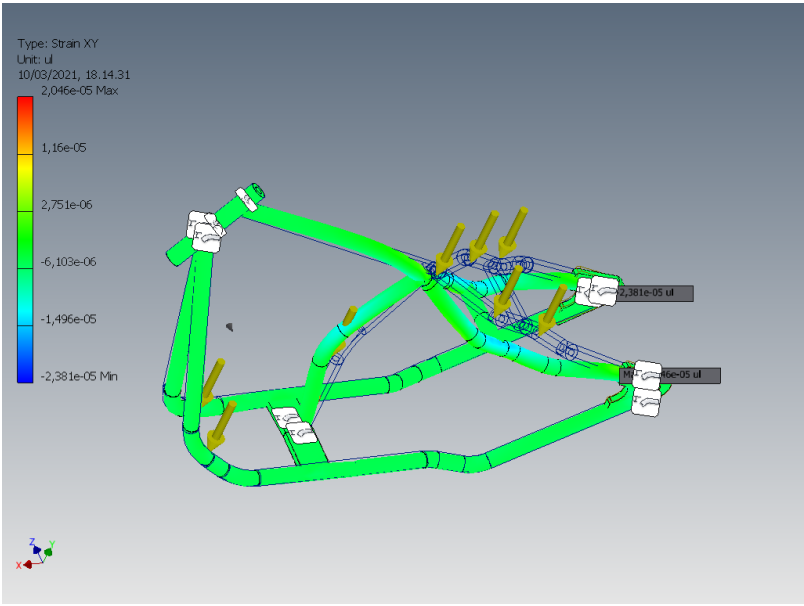
3rd Principal Strain

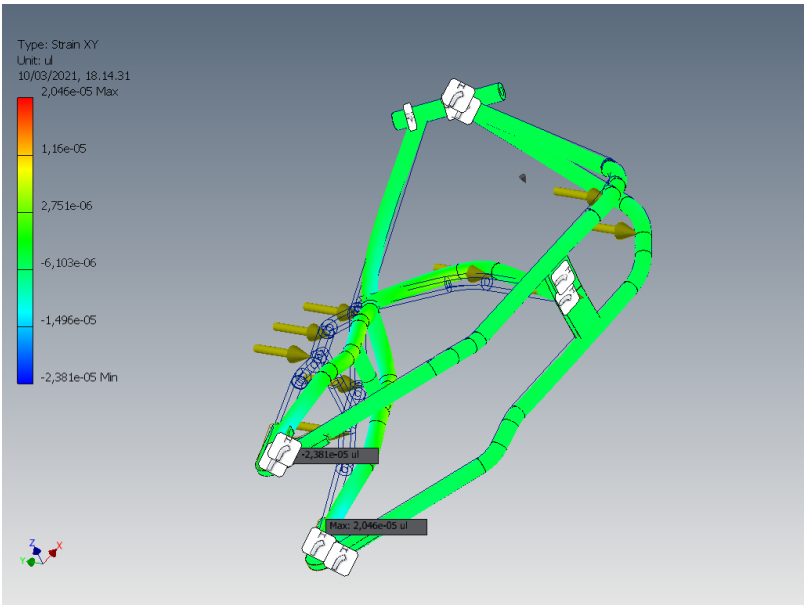


Strain XX

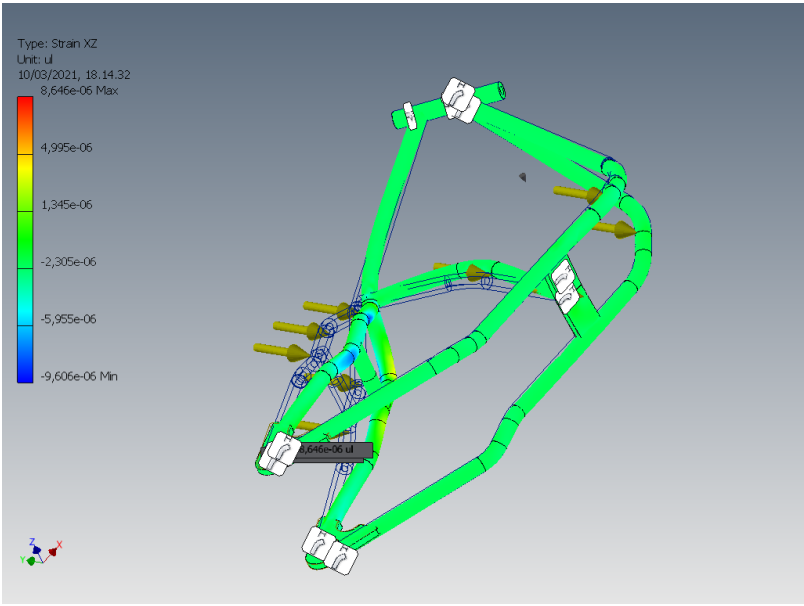
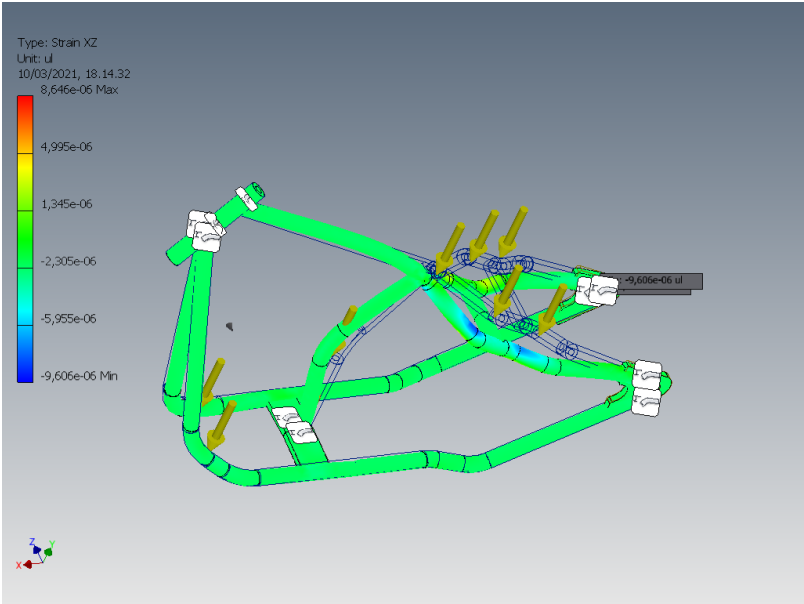


☐ Strain XY

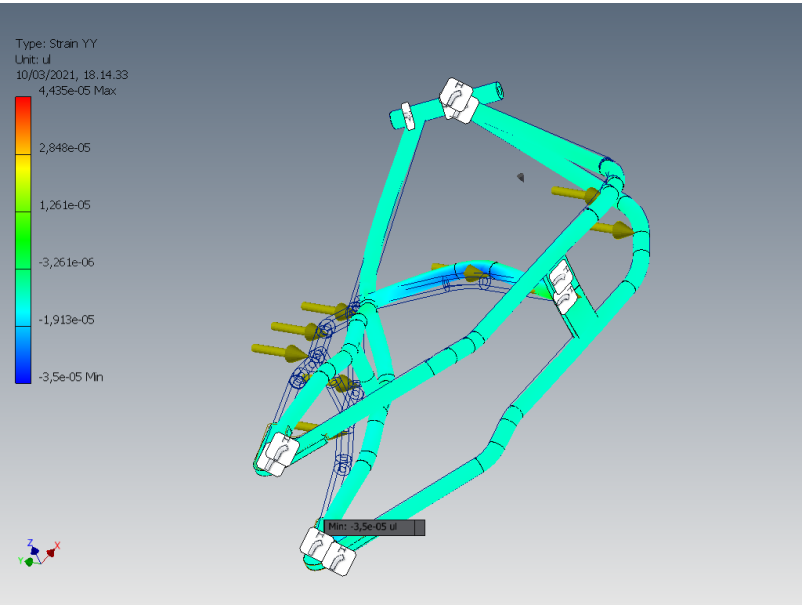
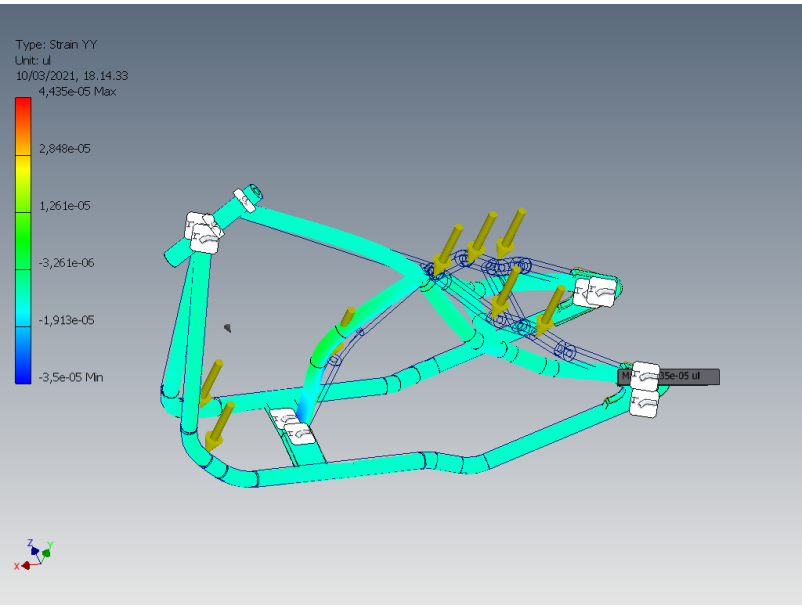




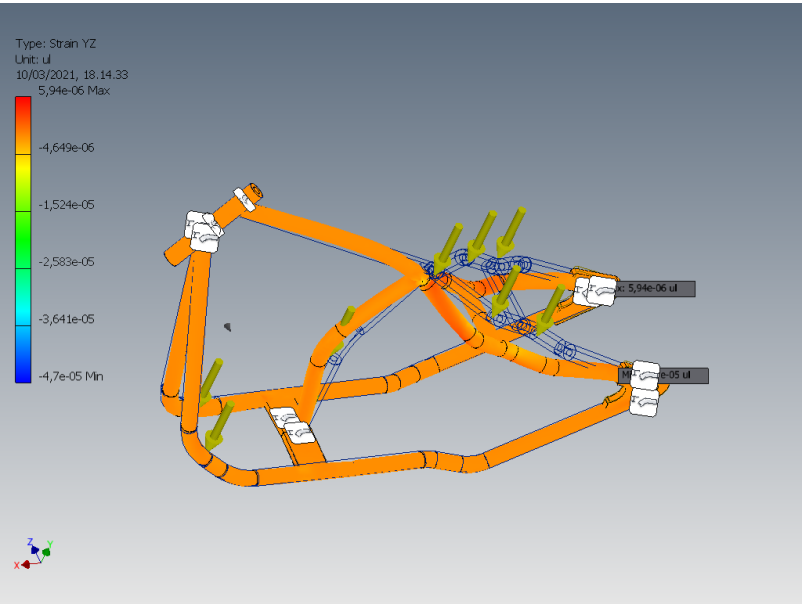
Strain XZ

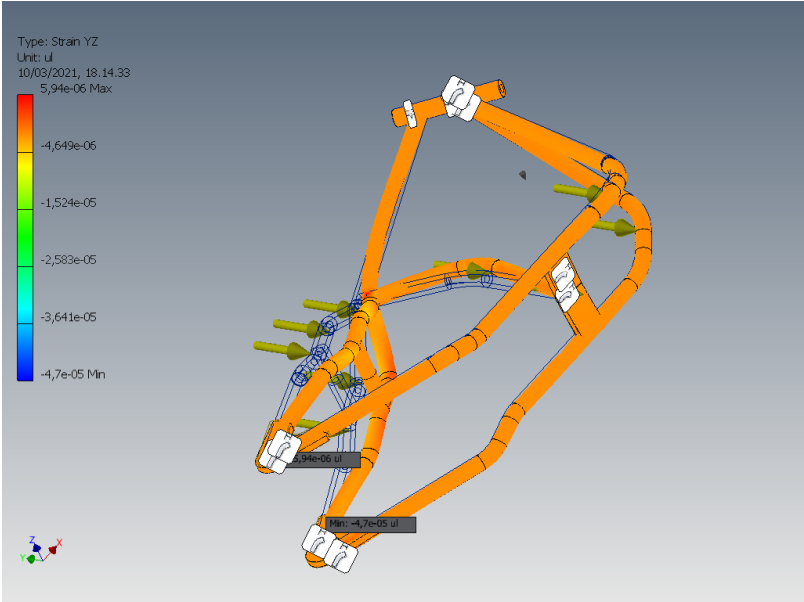


Strain YY

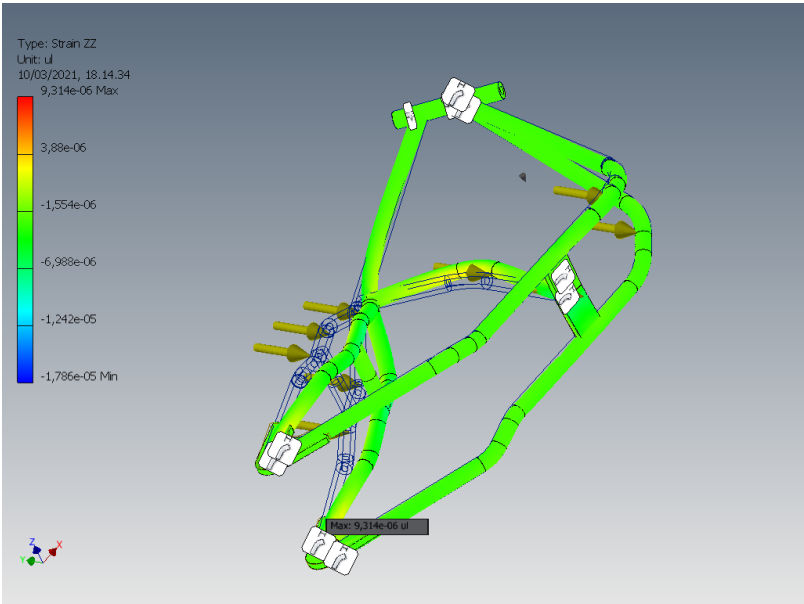
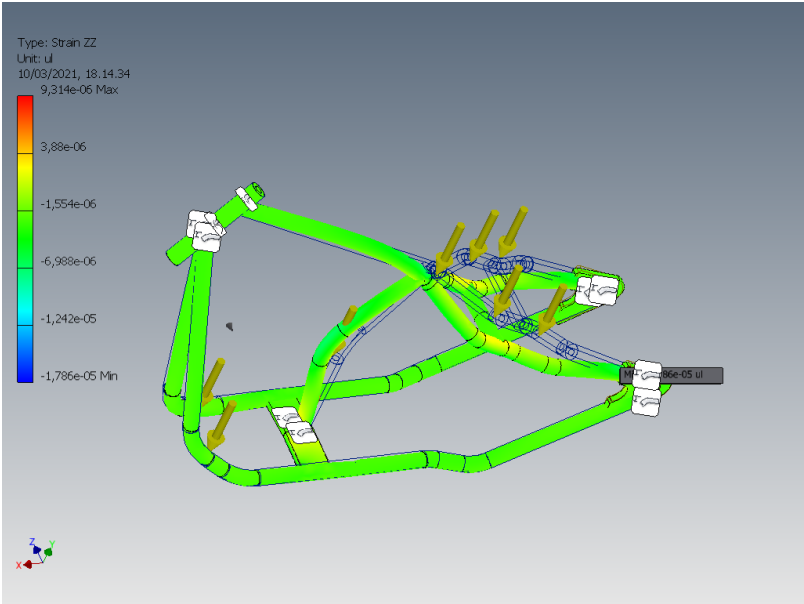


☐ Strain YZ

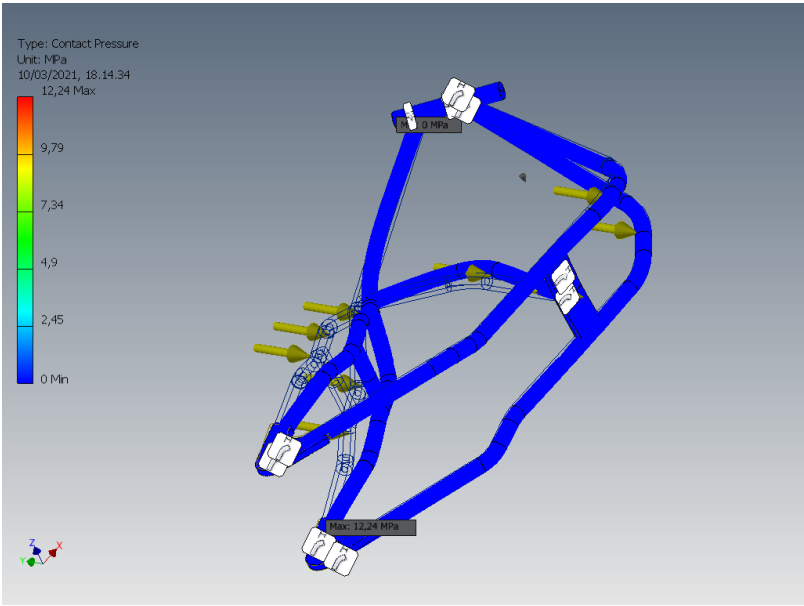
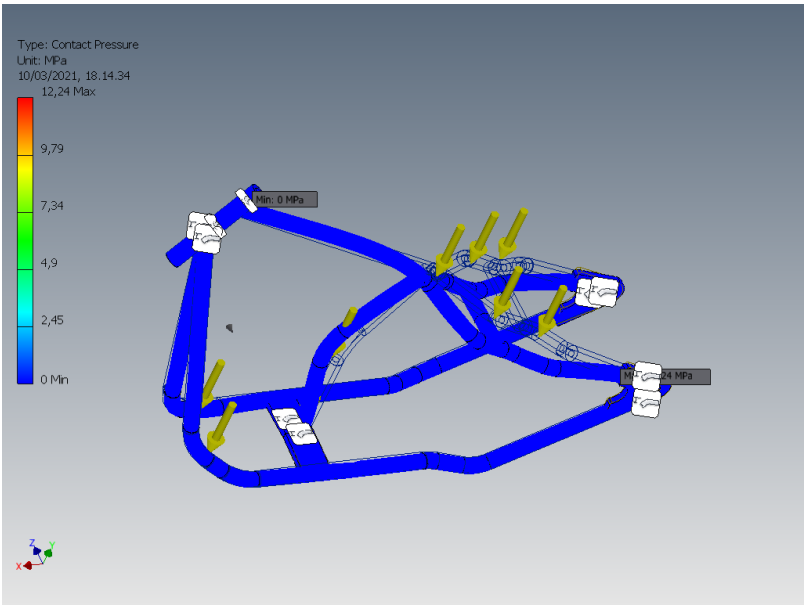




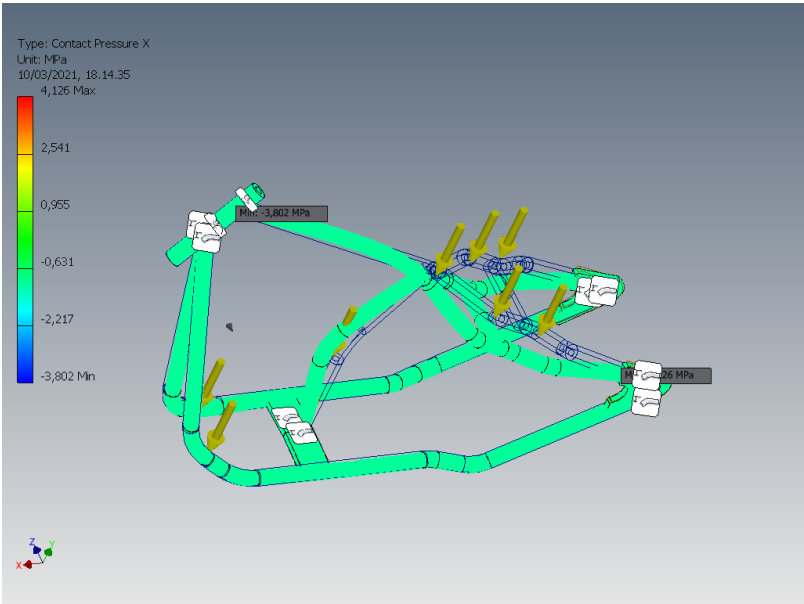
Strain ZZ

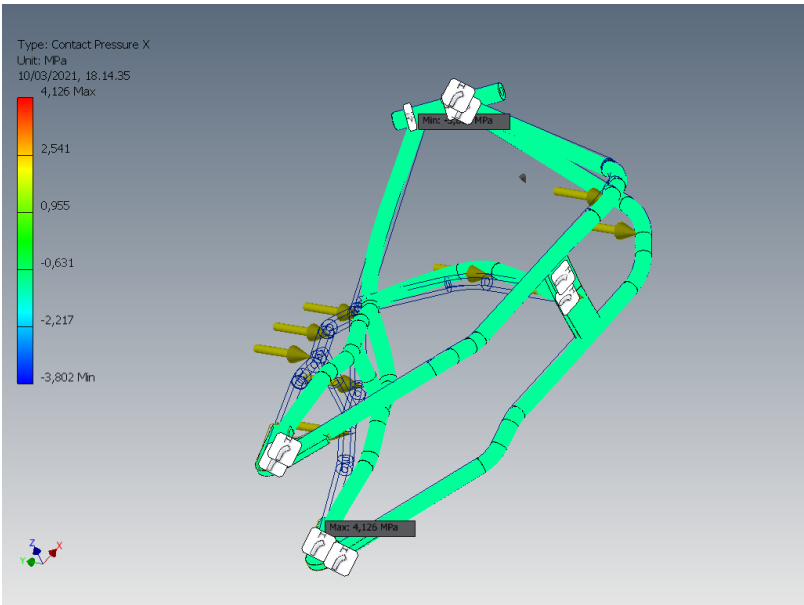


Contact Pressure

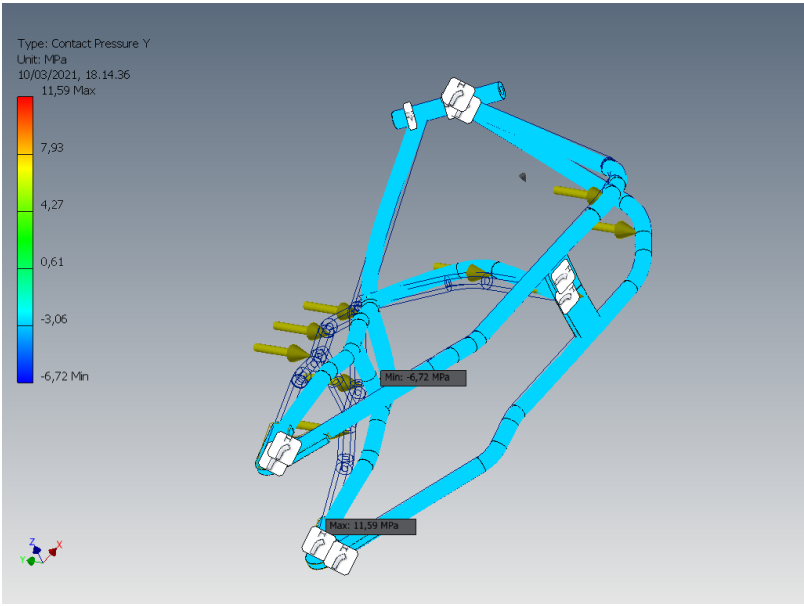
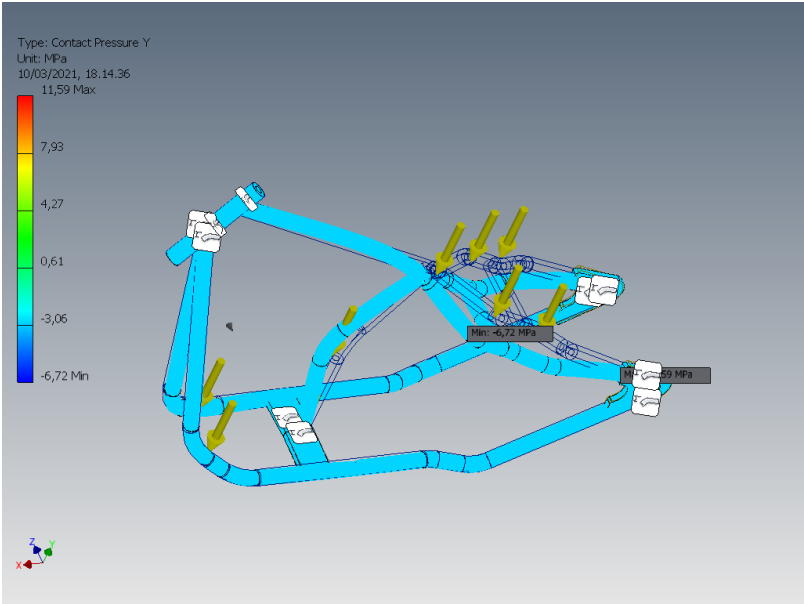


Contact Pressure X

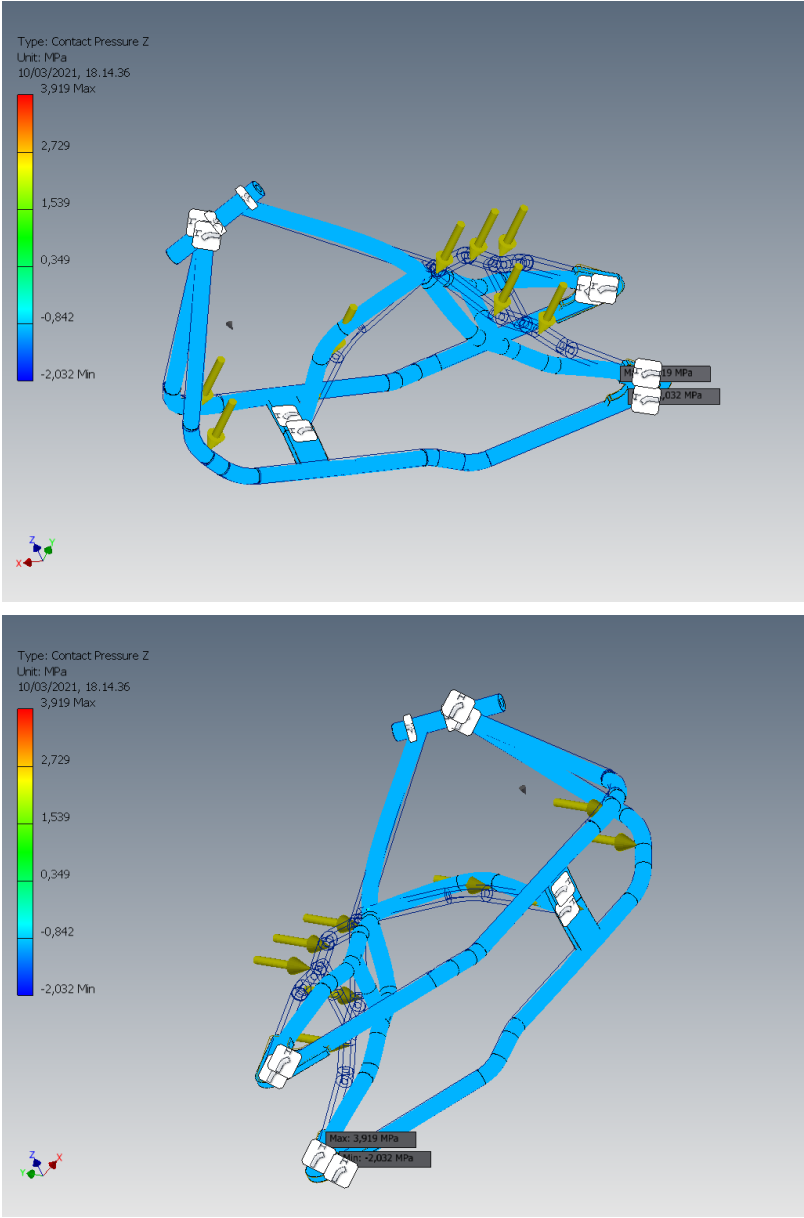




Contact Pressure Y



Contact Pressure Z



C:\Users\fiyan\Documents\Inventor\frame\Assembly 2.iam