

FEA REPORT - ANCHOR POST 1





OBJECTIVE:

The Objective of the Analysis is to validate the Anchorage post 1 used in safety equipments.

METHODOLOGY:

3D model is developed using modelling software and Finite Element Analysis is performed using FEA software for the given boundary conditions and loads. Results obtained are compared with the allowable limits to validate the geometry. TurboCAD / FreeCAD is used for generating 3D models and LISA is used for Finite Element Analysis. 3D Shell elements are used to develop finite element model.

MATERIAL PROPERTIES:

Material: AISI STEEL 316

Young's modulus: 2,10,000 N/mm²

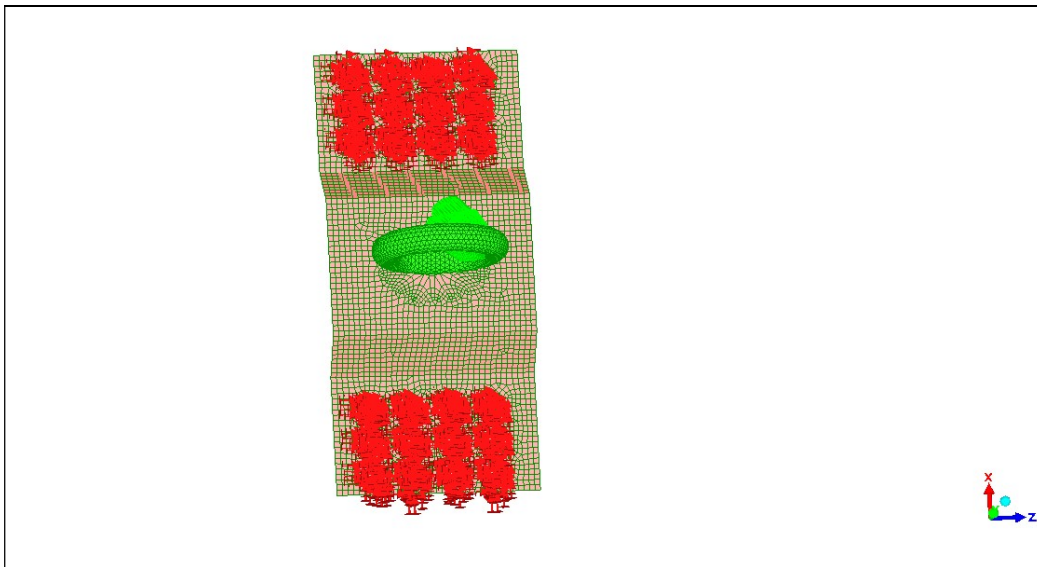
Poisson's ratio: 0.3

Tensile Strength Yield: 290 MPa

Tensile Strength Ultimate: 580 MPa

BOUNDARY CONDITIONS AND LOADS:

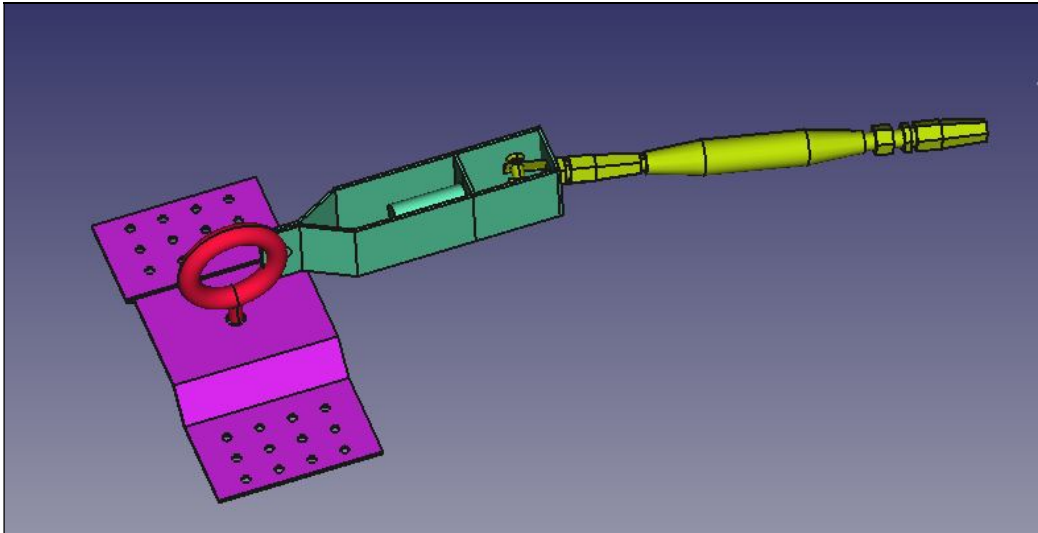
- Geometry is constrained in the bolt holes in all DOF.
- A Load of 4000 N resolved into two forces, in horizontal and vertical directions, equally distributed on three brackets, with a load of 1334 N, and 942 N on two directions, because of the steel rope inclination in usage, is applied on the Anchor post connectors.



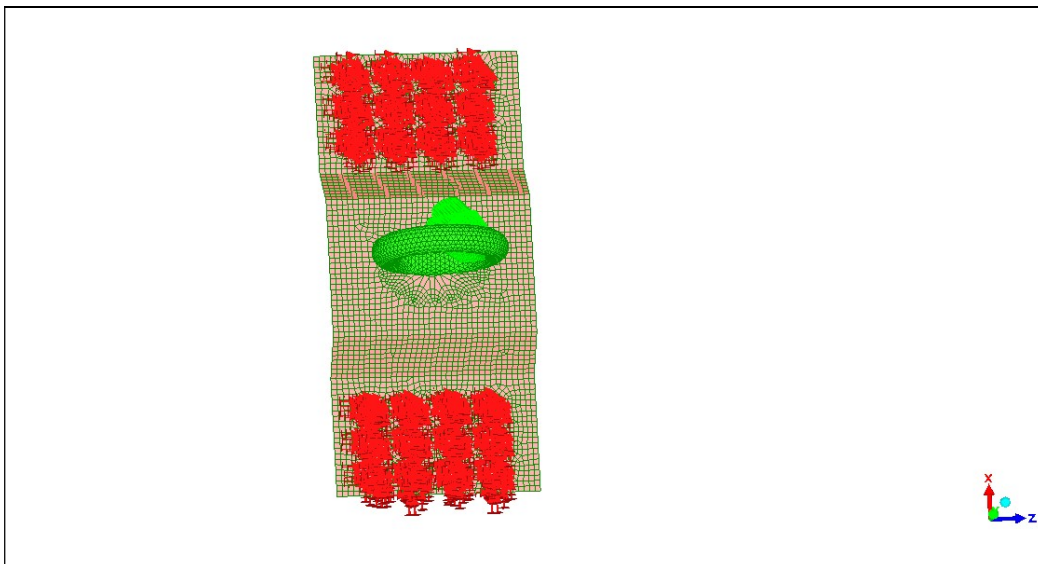
MESH, BOUNDARY CONDITIONS AND LOADS

RESULTS:

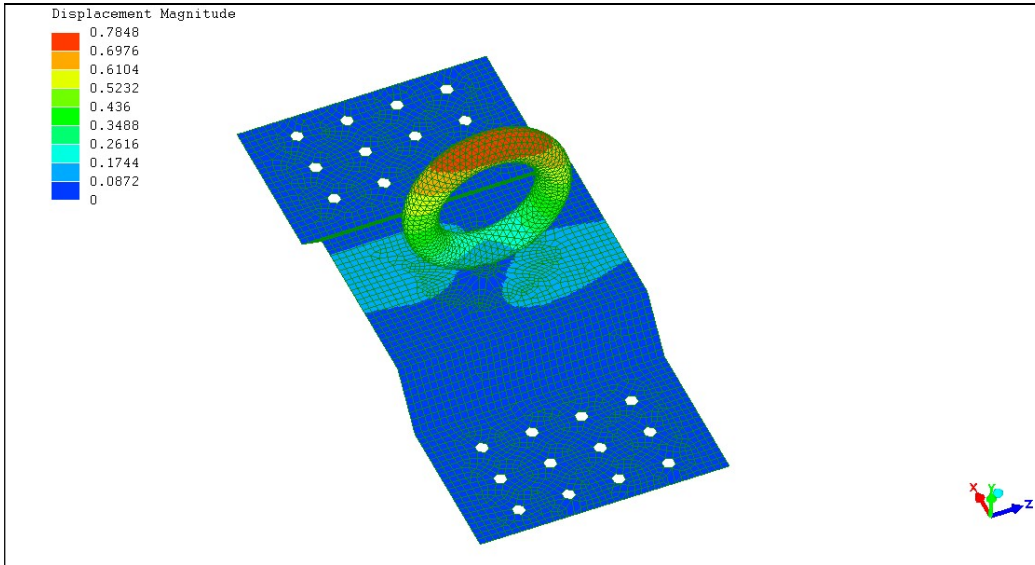
START ANCHORAGE POST



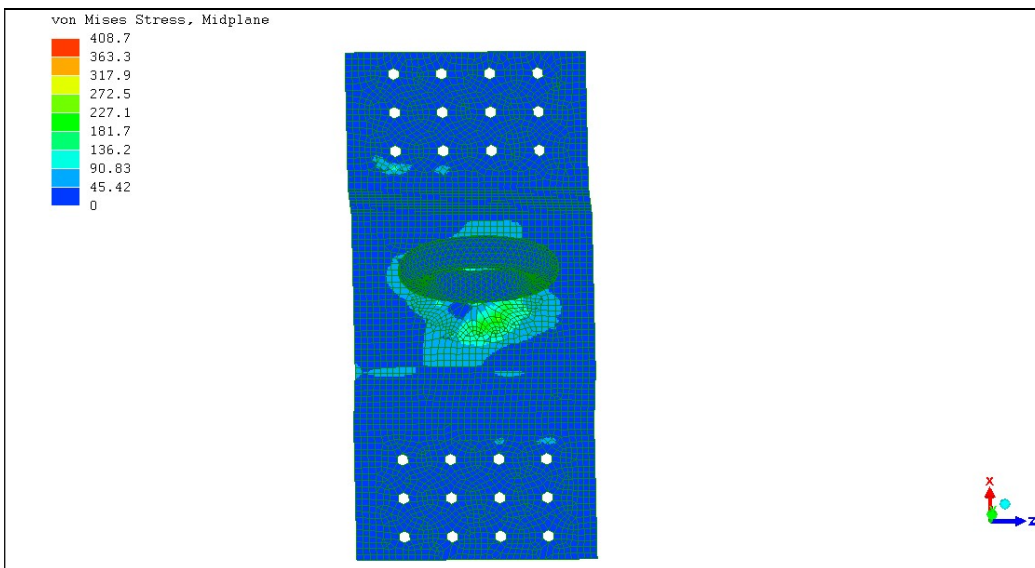
3D MODEL



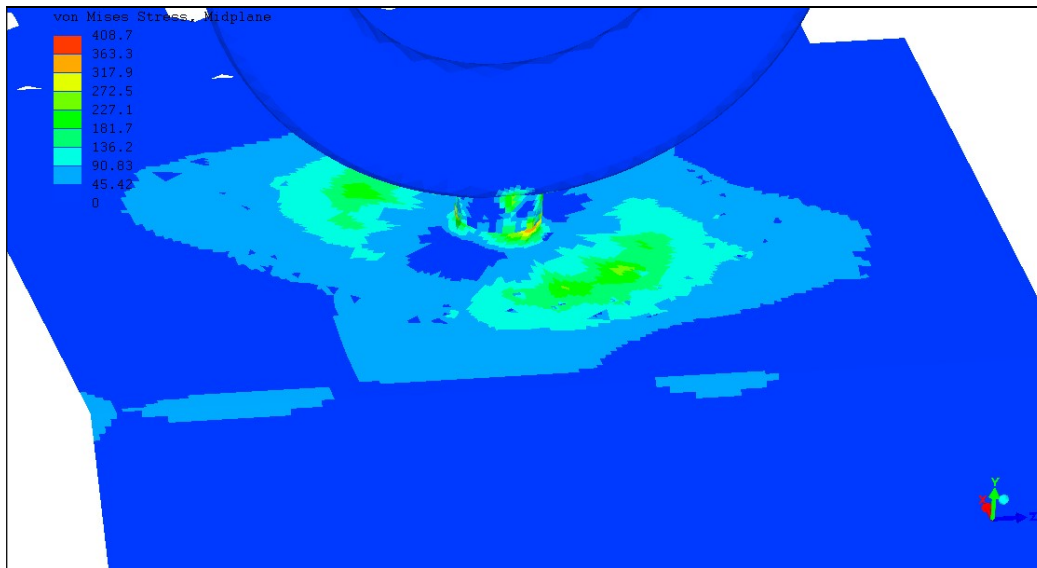
FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



MAXIMUM DEFORMATION: 0.79 MM

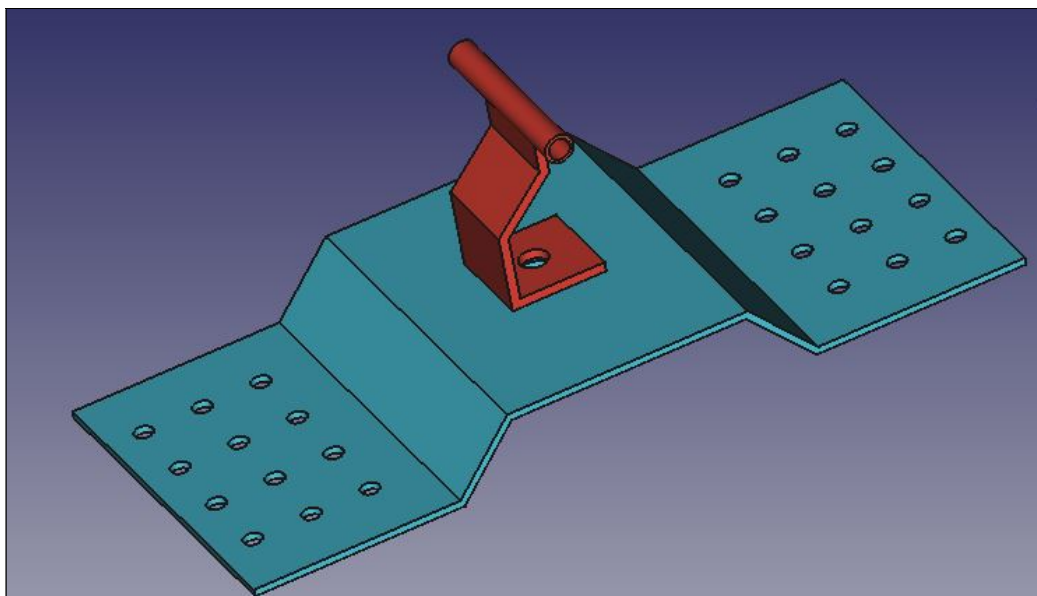


MAXIMUM VON MISES STRESS: 182 MPA (409 MPA)

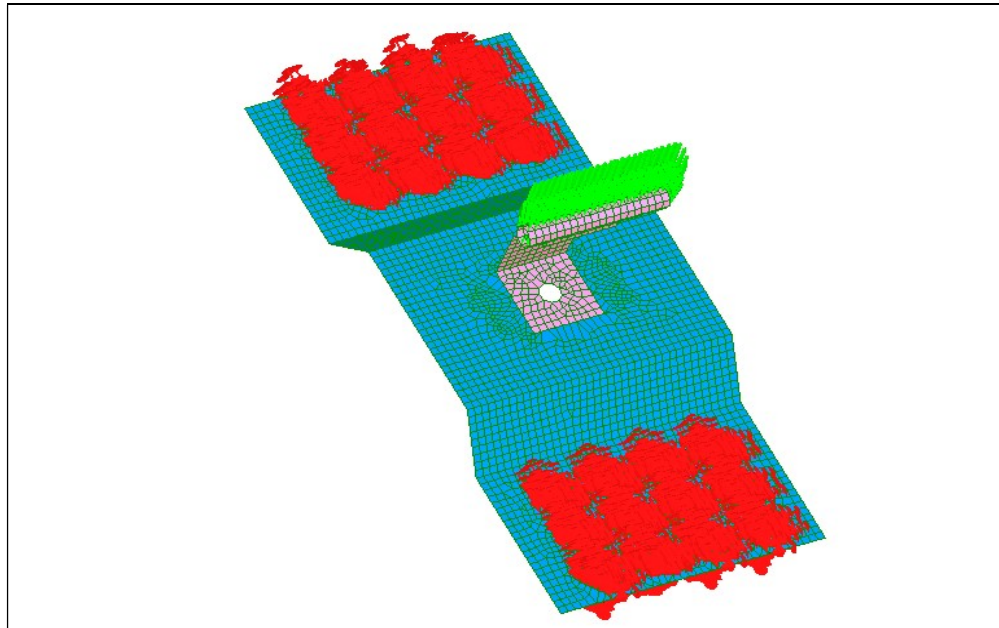


MAXIMUM VON MISES STRESS: 182 MPA (409 MPA)

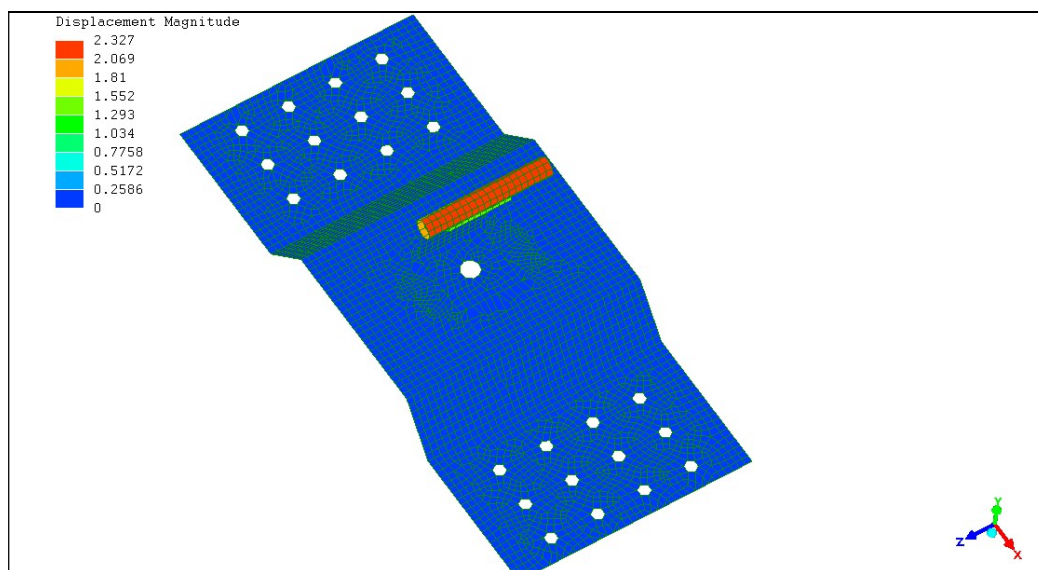
INTERMEDIATE ANCHORAGE POST



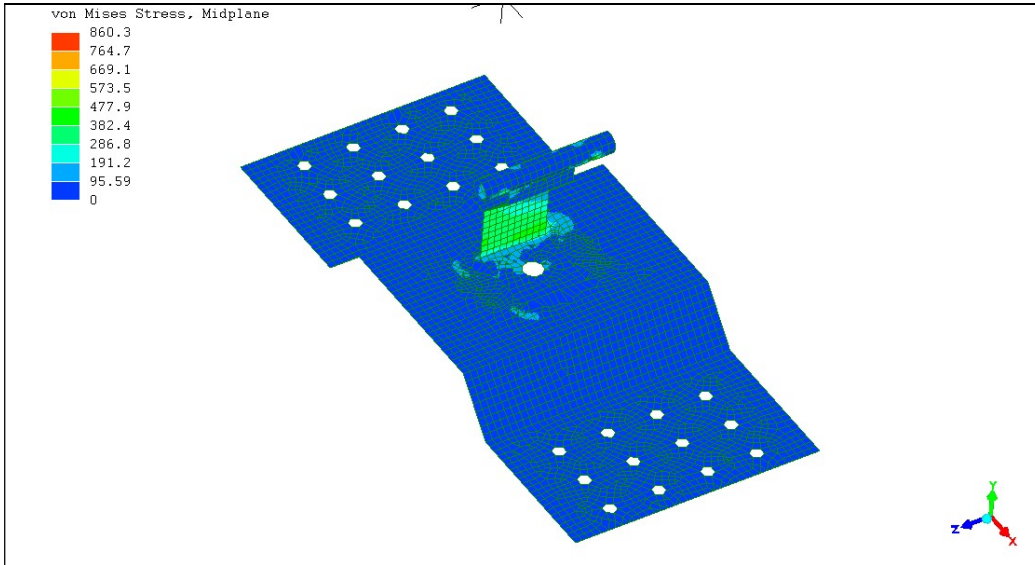
3D MODEL



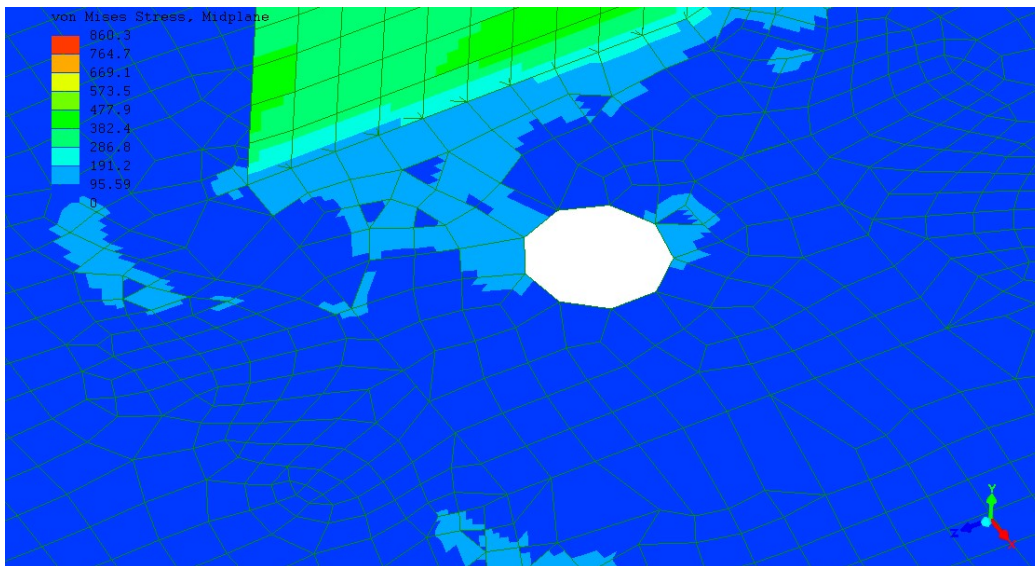
FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



MAXIMUM DEFORMATION: 2.33 MM

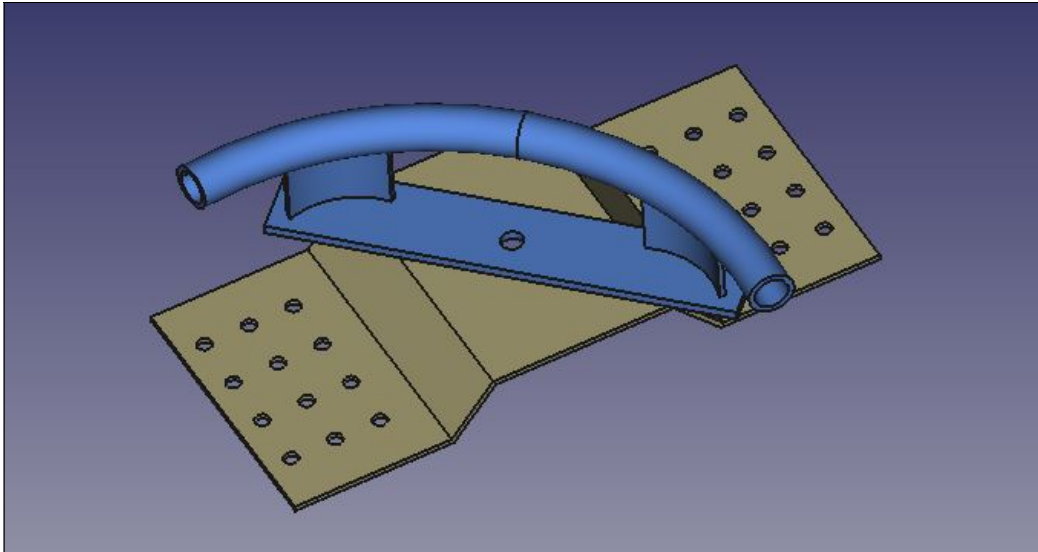


MAXIMUM VON MISES STRESS: 192 MPA (861 MPA)

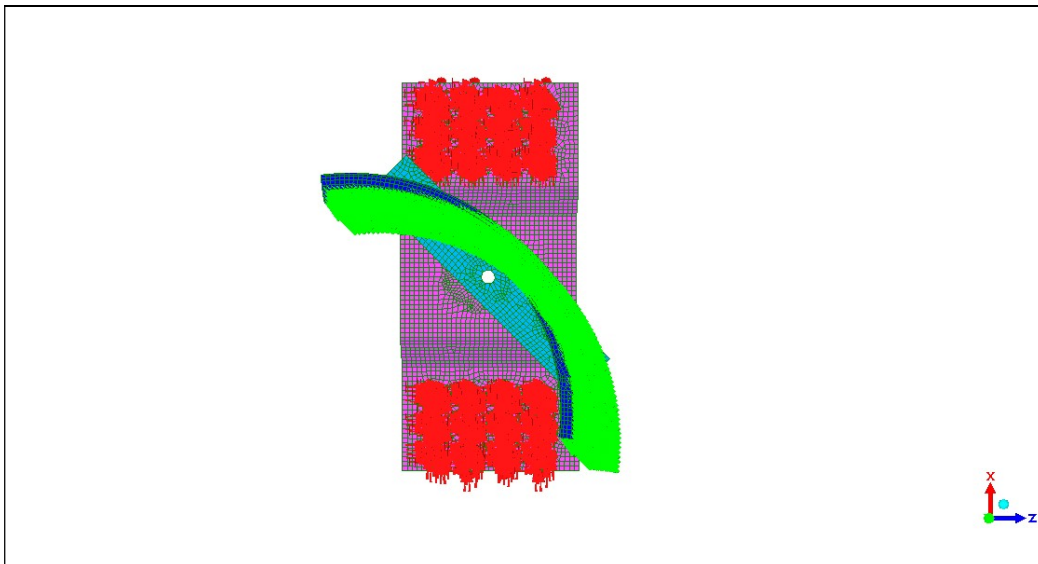


MAXIMUM VON MISES STRESS: 192 MPA (861 MPA)

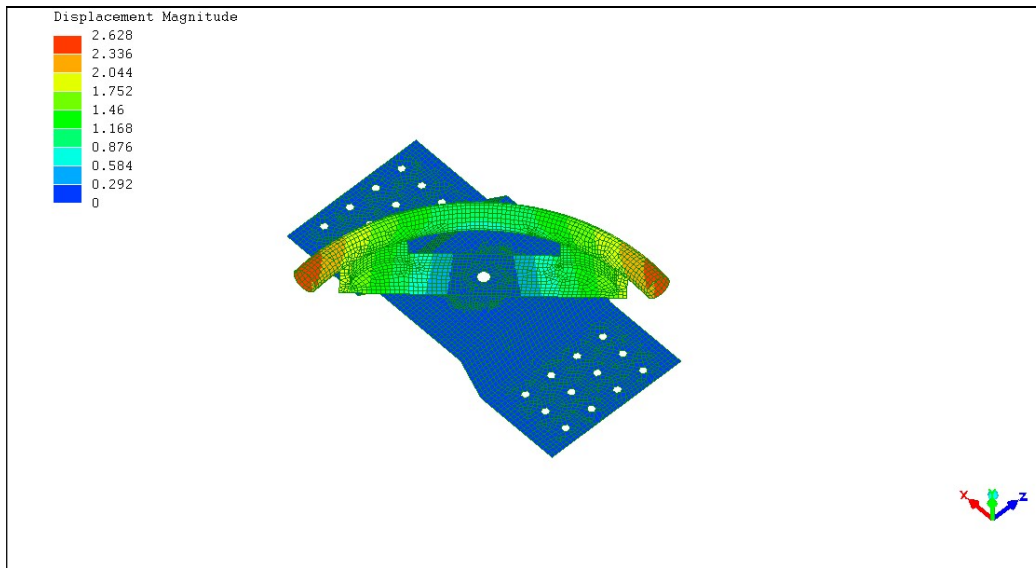
CORNER ANCHORAGE POST



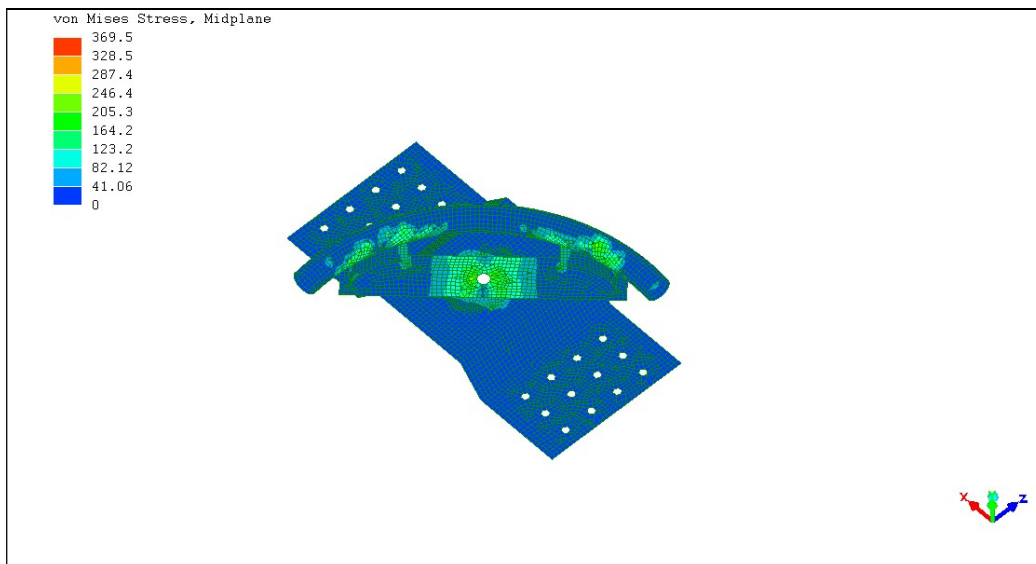
3D MODEL`



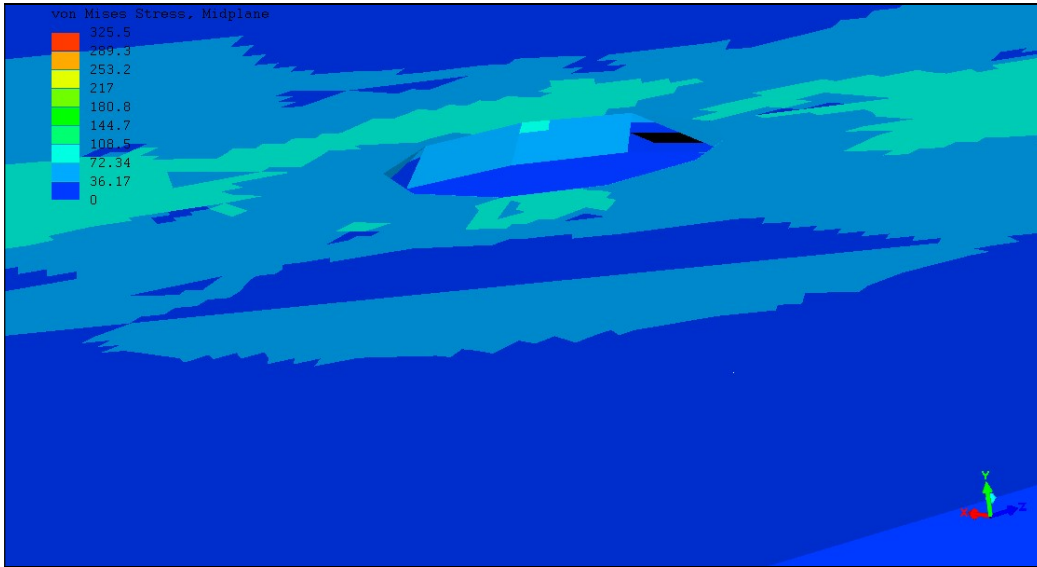
FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



MAXIMUM DEFORMATION: 2.63 MM

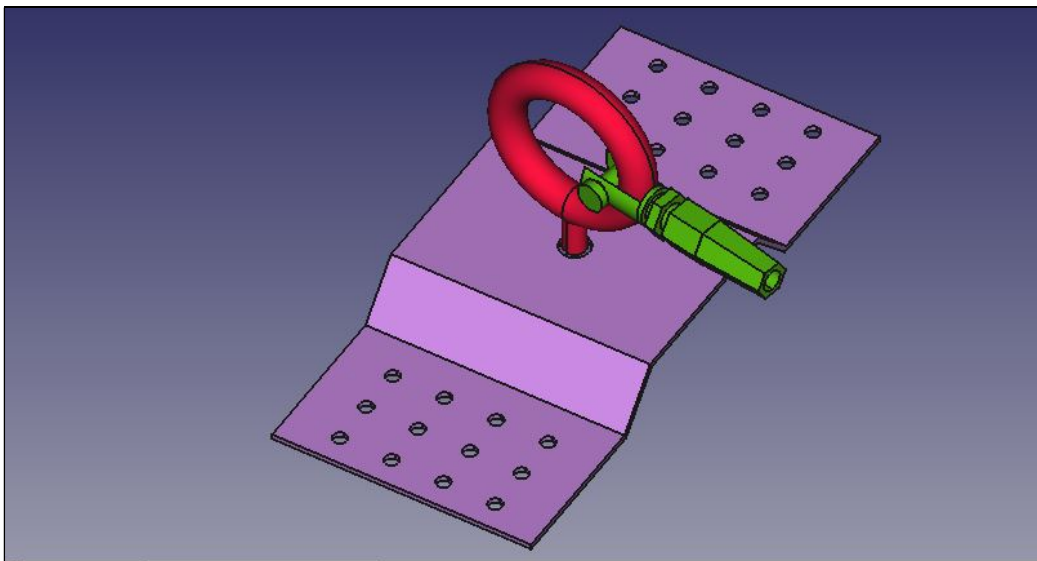


MAXIMUM VON MISES STRESS: 123 MPA (370 MPA)

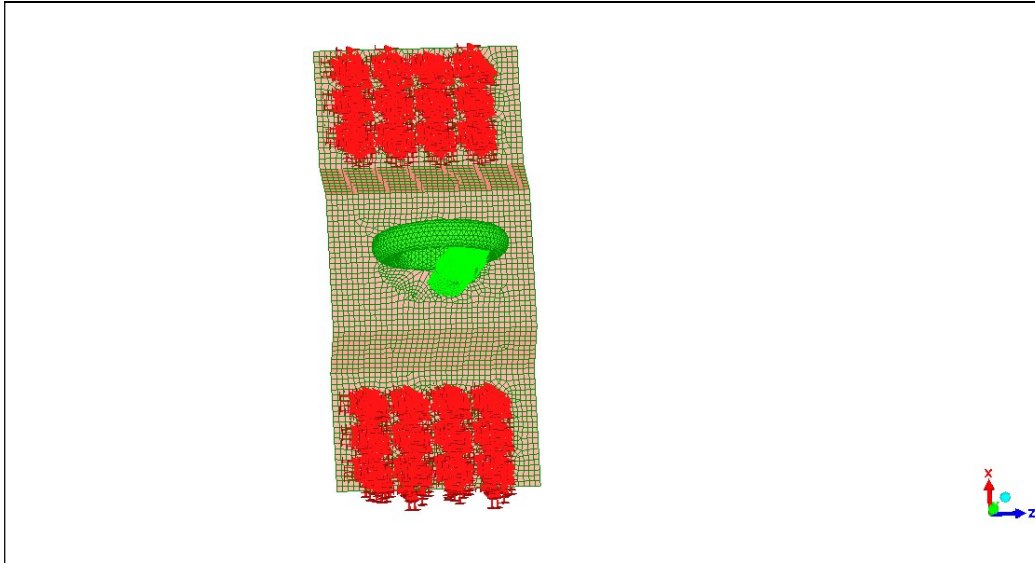


MAXIMUM VON MISES STRESS: 123 MPA (370 MPA)

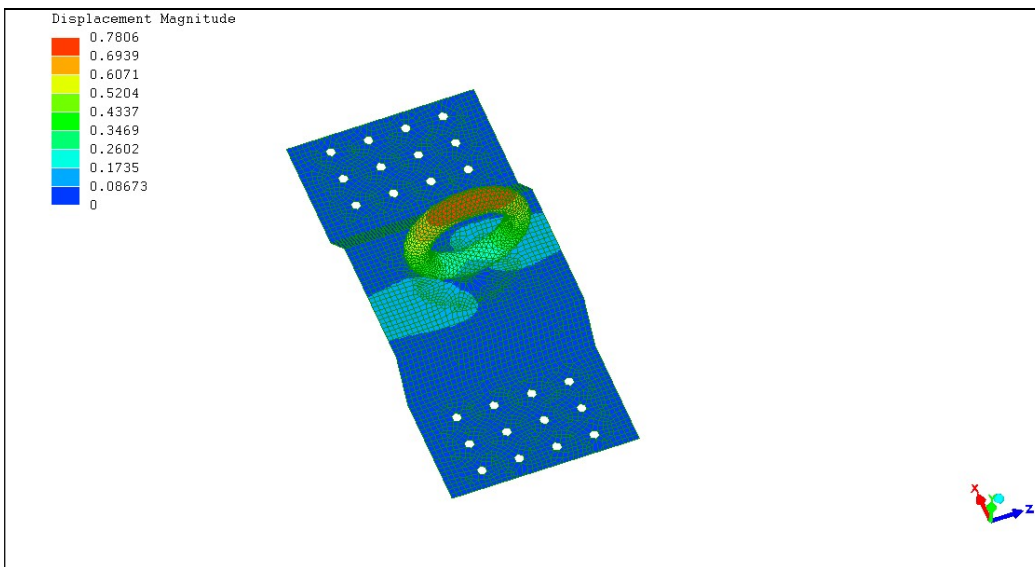
END ANCHORAGE POST



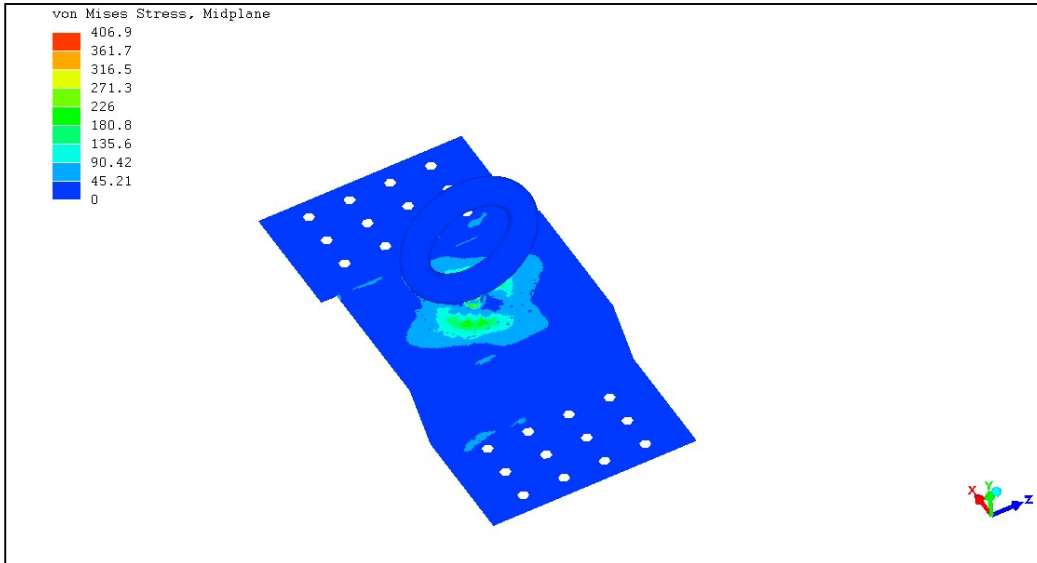
3D MODEL



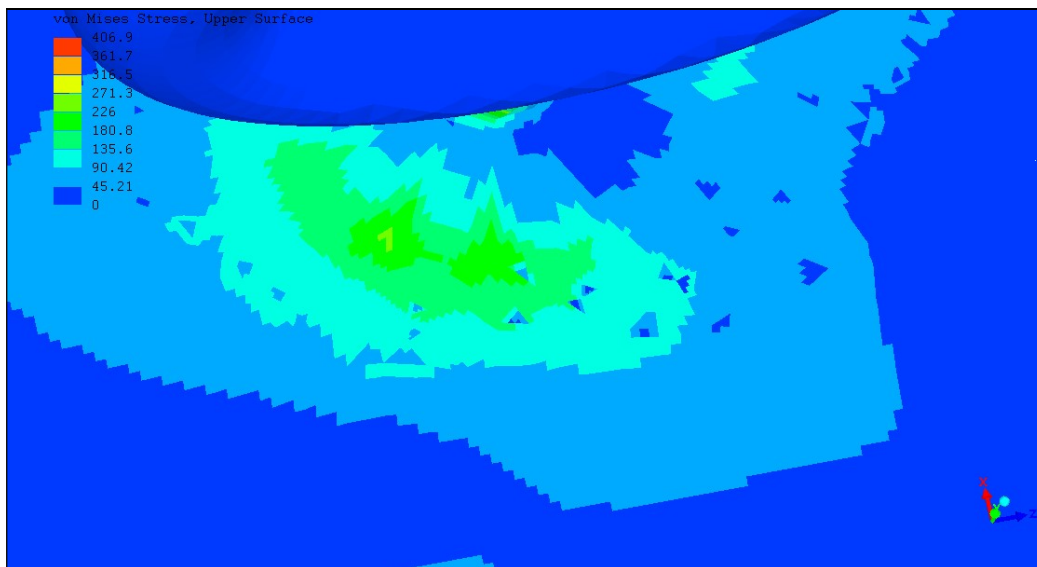
FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



MAXIMUM DEFORMATION: 0.78 MM



MAXIMUM VON MISES STRESS: 181 MPA (407 MPA)



MAXIMUM VON MISES STRESS: 181 MPA (407 MPA)



RESULTS SUMMARY

Sl.No.	Description	Deflection(mm)	Stress(MPa)
1	Start Anchor Post	0.79	182(409)
2	Intermediate Anchor Post	2.33	192(861)
3	Corner Anchor Post	2.63	123(370)
4	End Anchor Post	0.78	181(407)

Maximum Deformation and Stresses are within allowable limits.

FEA REPORT - ANCHOR POST 2





OBJECTIVE:

The Objective of the Analysis is to validate the Anchorage post 2 used in safety equipments.

METHODOLOGY:

3D model is developed using modelling software and Finite Element Analysis is performed using FEA software for the given boundary conditions and loads. Results obtained are compared with the allowable limits to validate the geometry. TurboCAD / FreeCAD is used for generating 3D models and LISA is used for Finite Element Analysis. 3D Shell elements are used to develop finite element model.

MATERIAL PROPERTIES:

Material: AISI STEEL 316

Young's modulus: 2,10,000 N/mm²

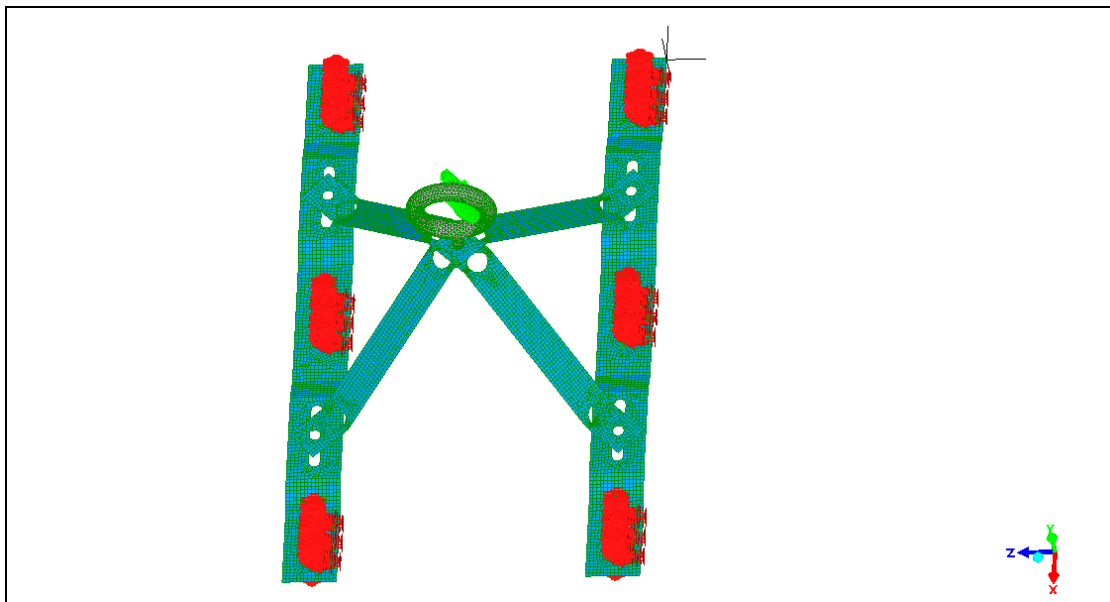
Poisson's ratio: 0.3

Tensile Strength Yield: 290 MPa

Tensile Strength Ultimate: 580 MPa

BOUNDARY CONDITIONS AND LOADS:

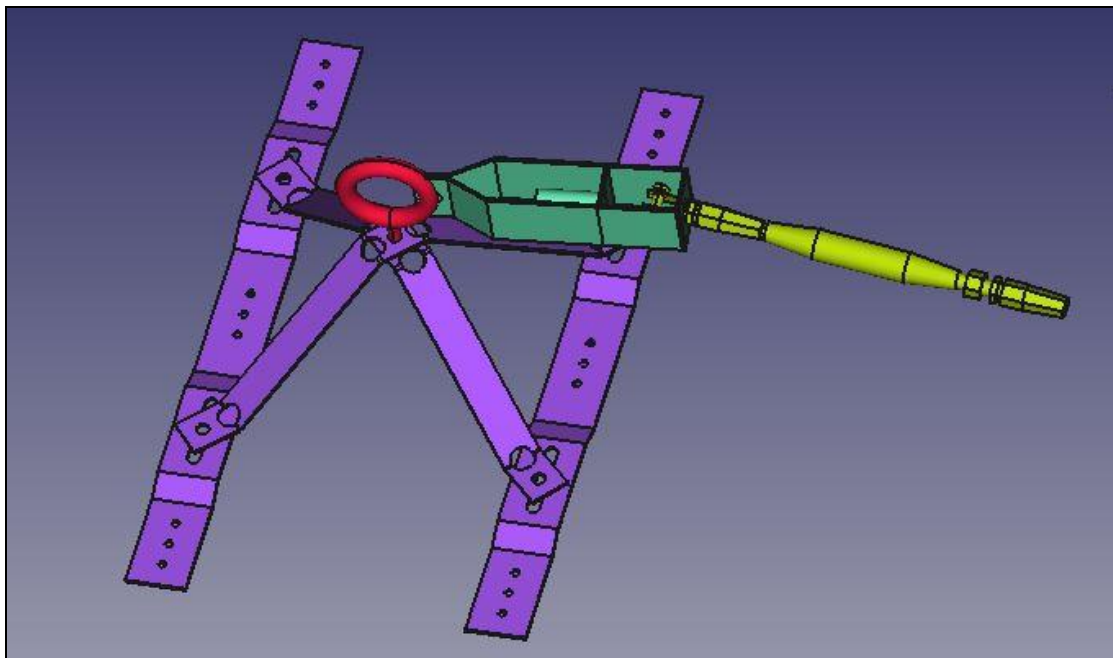
- Geometry is constrained in the bolt holes in all DOF.
- A Load of 4000 N resolved into two forces, in horizontal and vertical directions, equally distributed on three brackets, with a load of 1334 N, and 942 N on two directions, because of the steel rope inclination in usage, is applied on the Anchor post connectors.



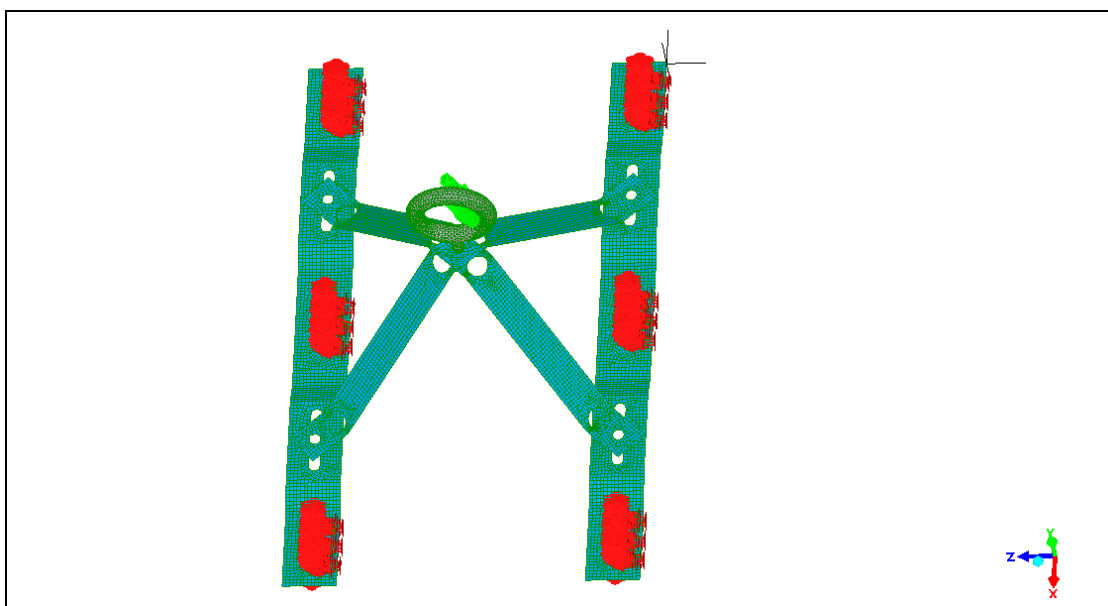
MESH, BOUNDARY CONDITIONS AND LOADS

RESULTS:

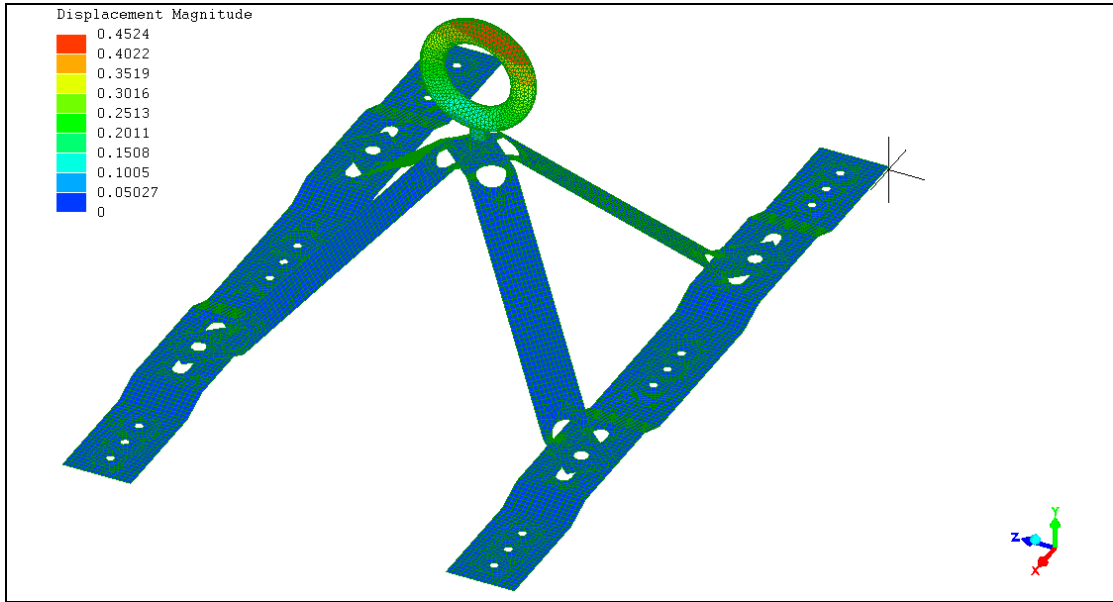
START ANCHORAGE POST



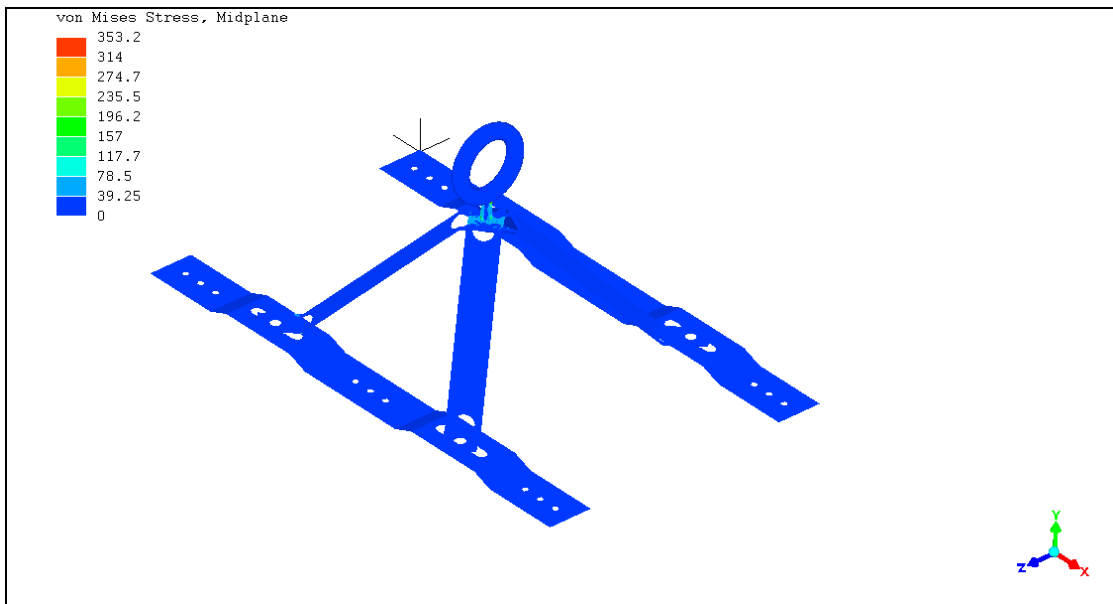
3D MODEL



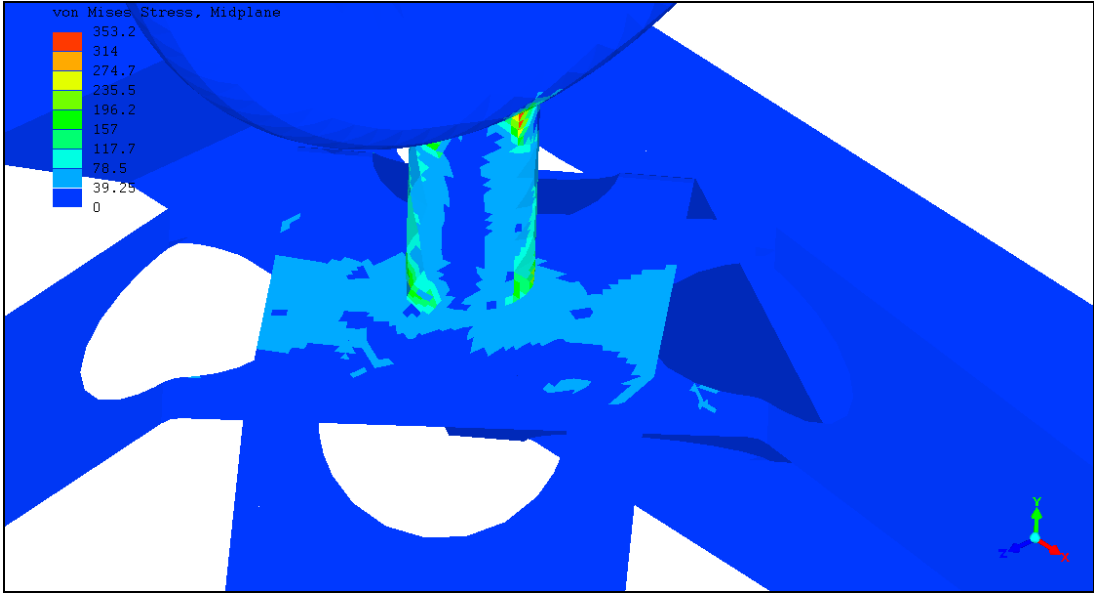
FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



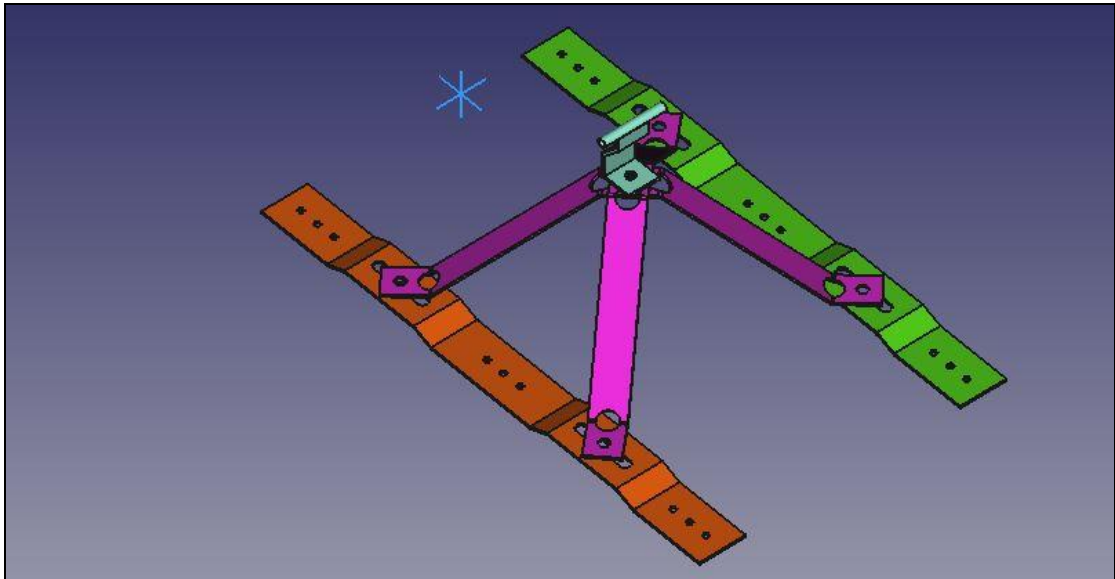
MAXIMUM DEFORMATION: 0.46 MM



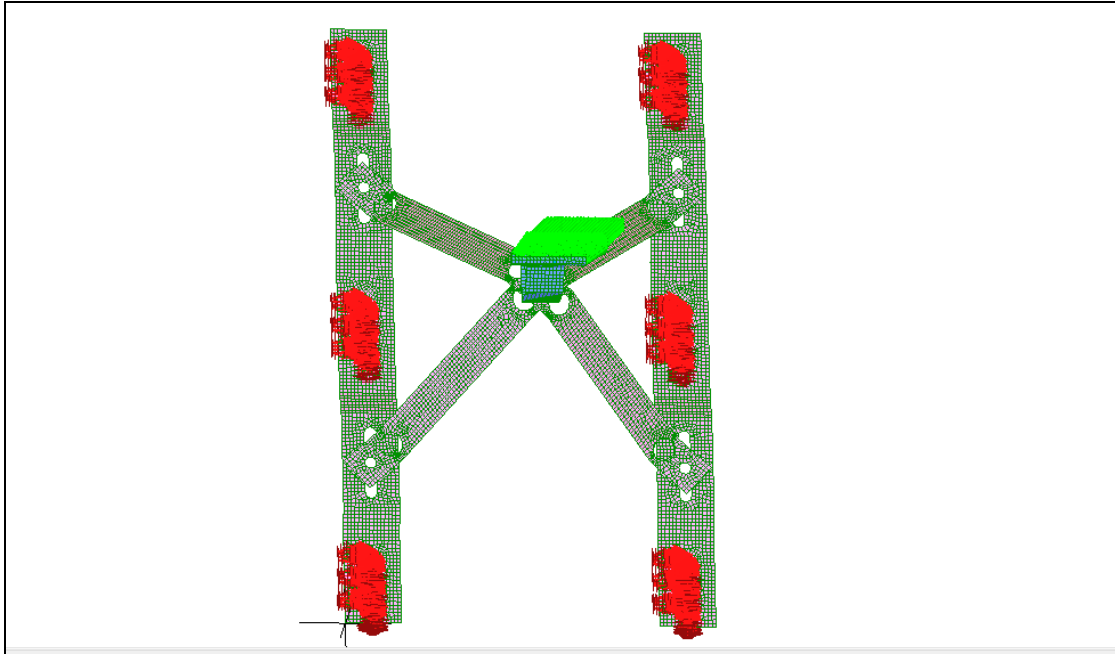
MAXIMUM VON MISES STRESS: 117 MPA (353 MPA)



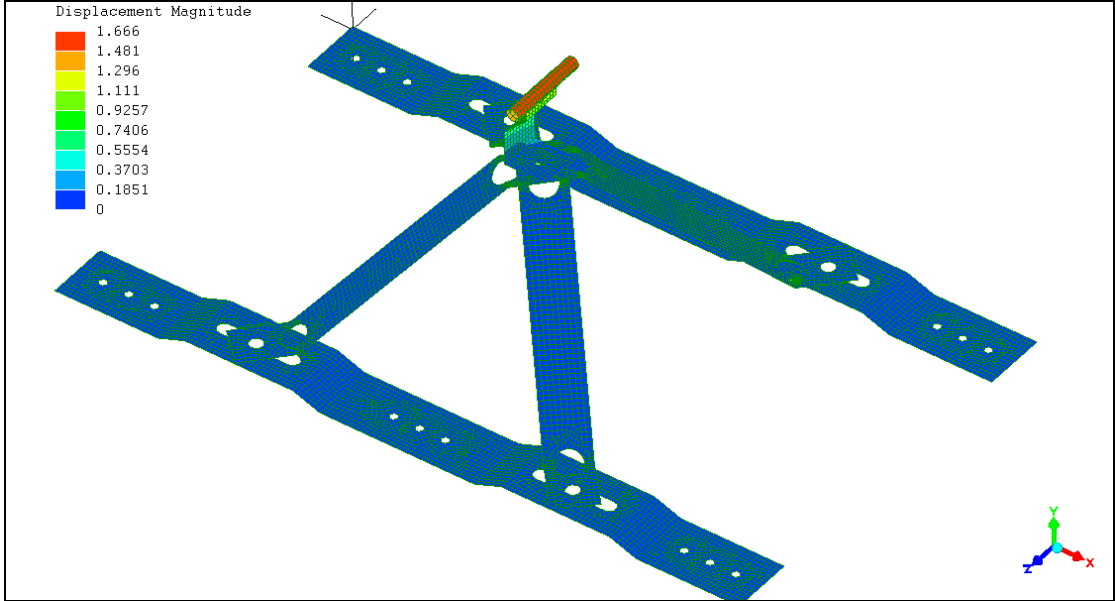
INTERMEDIATE ANCHORAGE POST



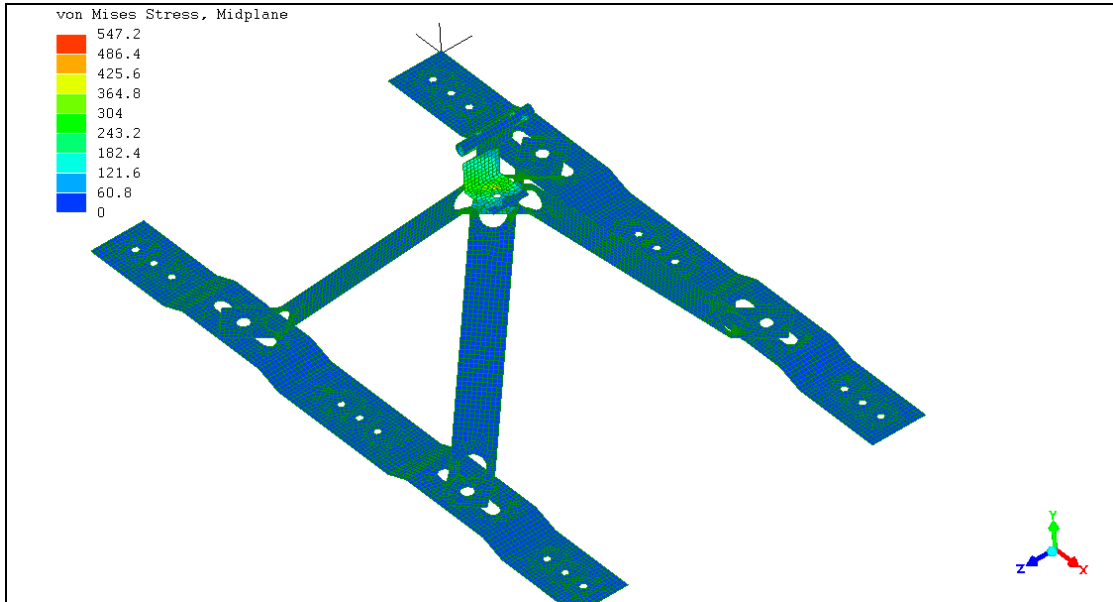
3D MODEL



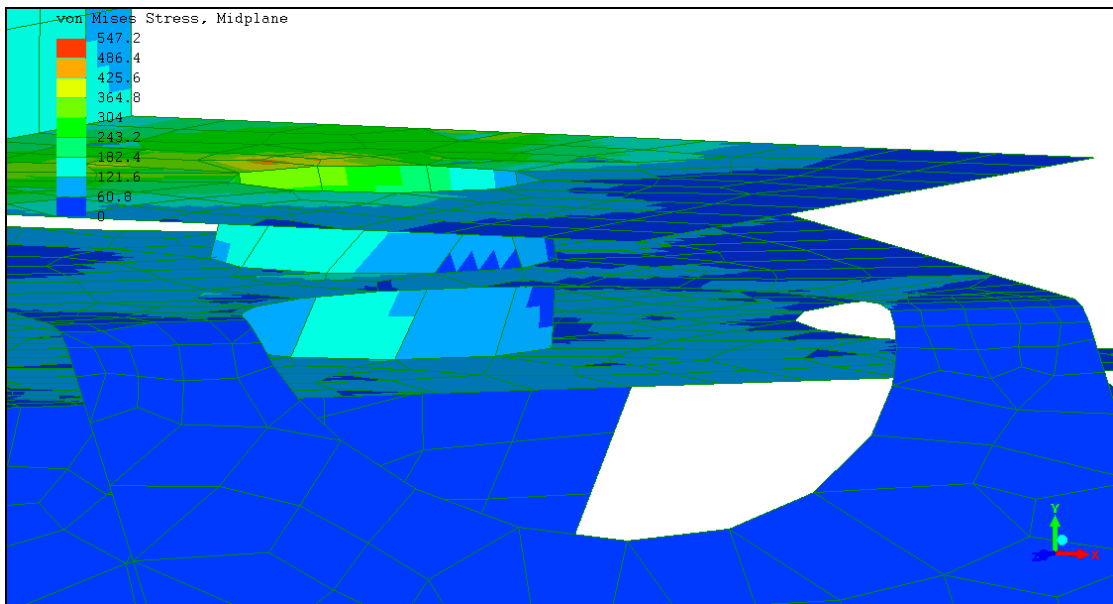
FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



MAXIMUM DEFORMATION: 1.67 MM

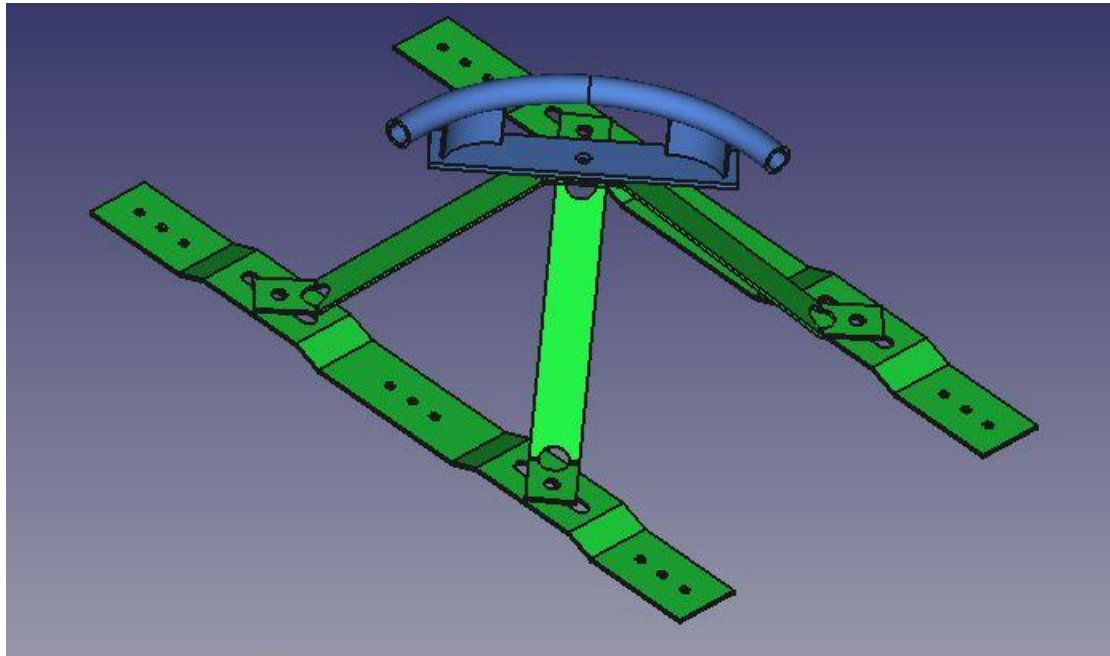


MAXIMUM VON MISES STRESS: 182 MPA (548 MPA)

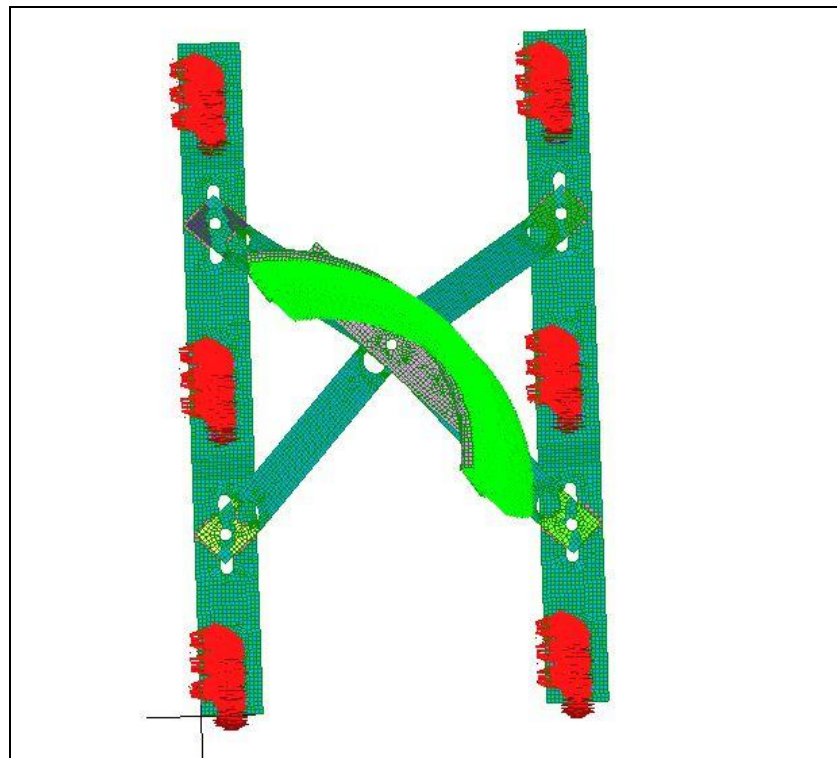


MAXIMUM VON MISES STRESS: 182 MPA (548 MPA)

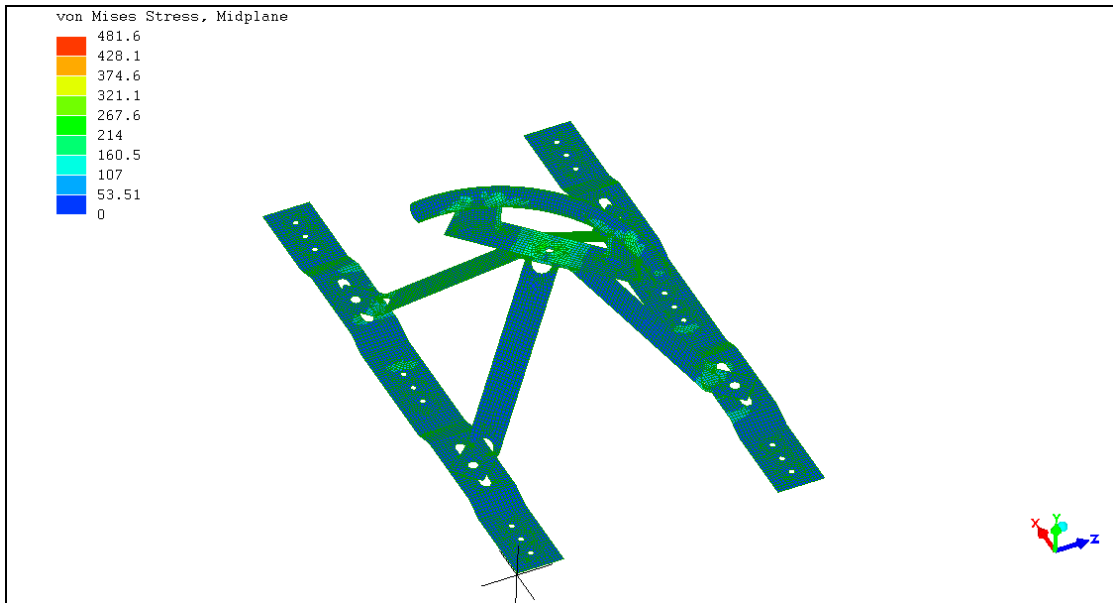
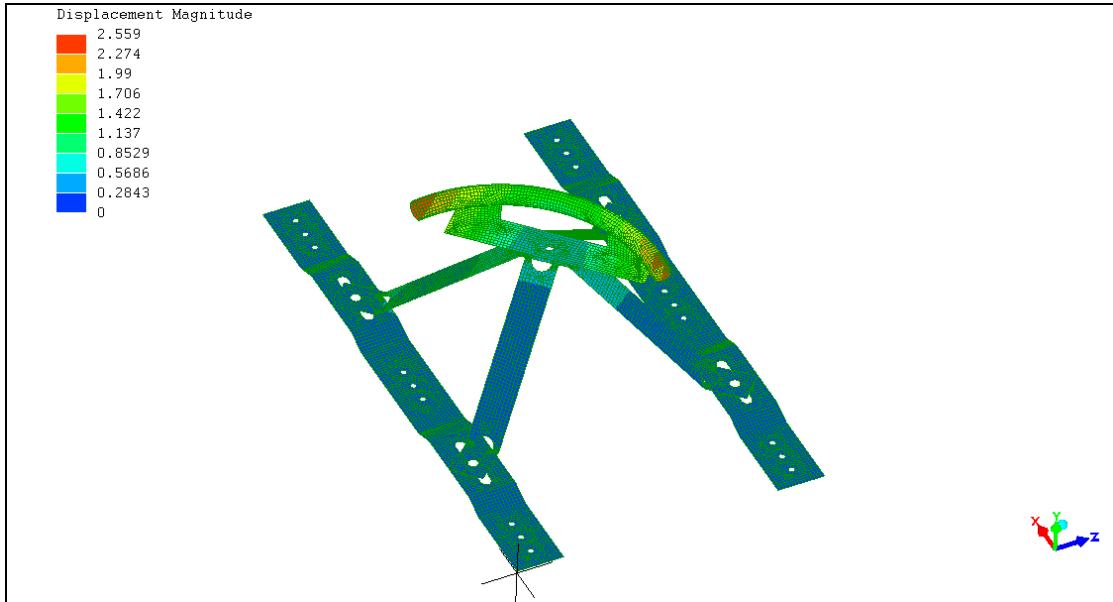
CORNER ANCHORAGE POST

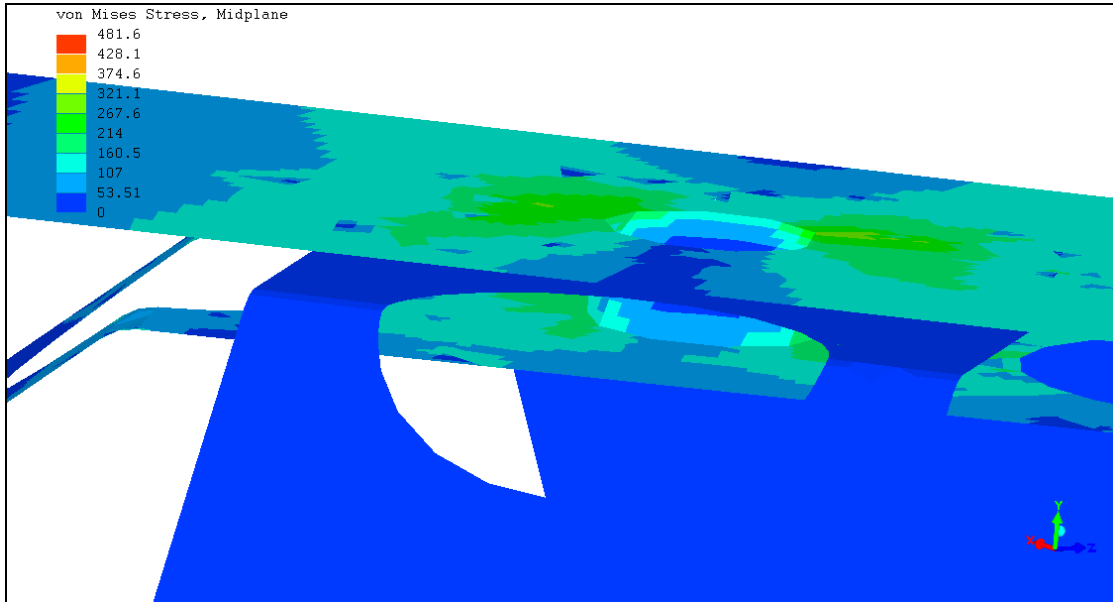


3D MODEL



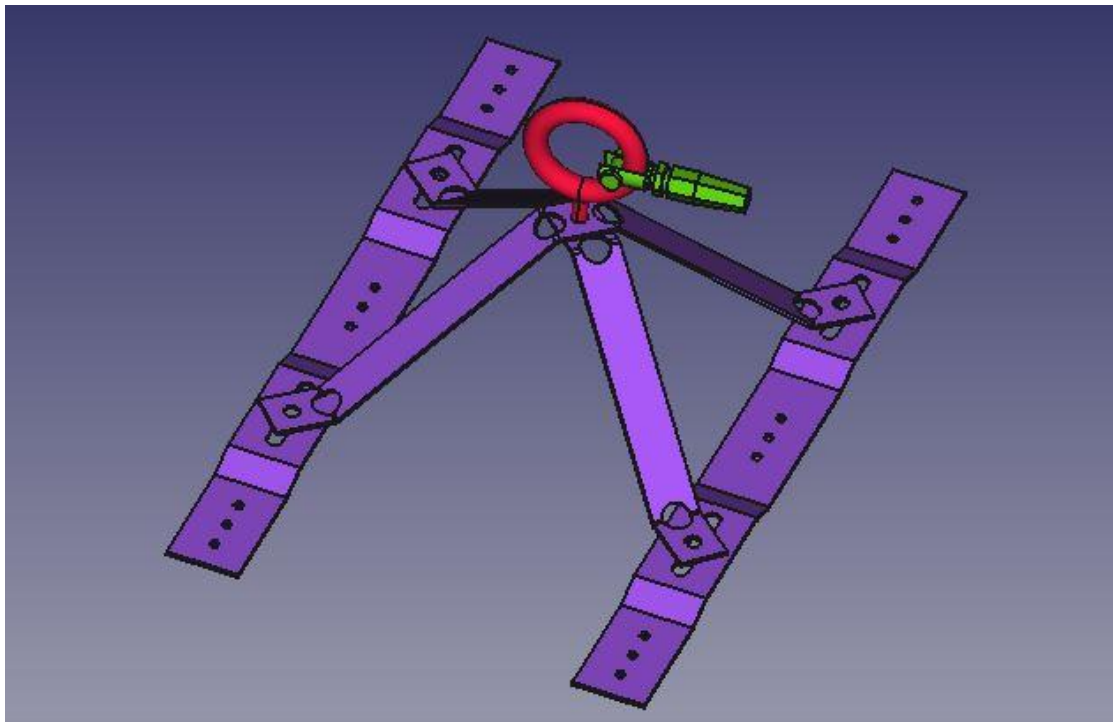
FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



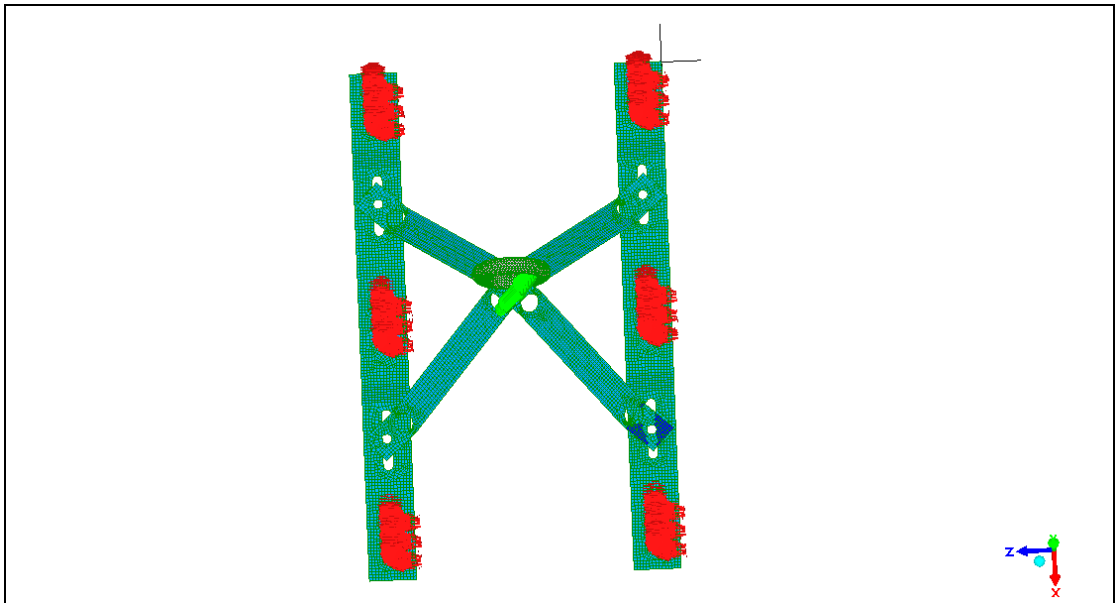


MAXIMUM VON MISES STRESS: 214 MPA (482 MPA)

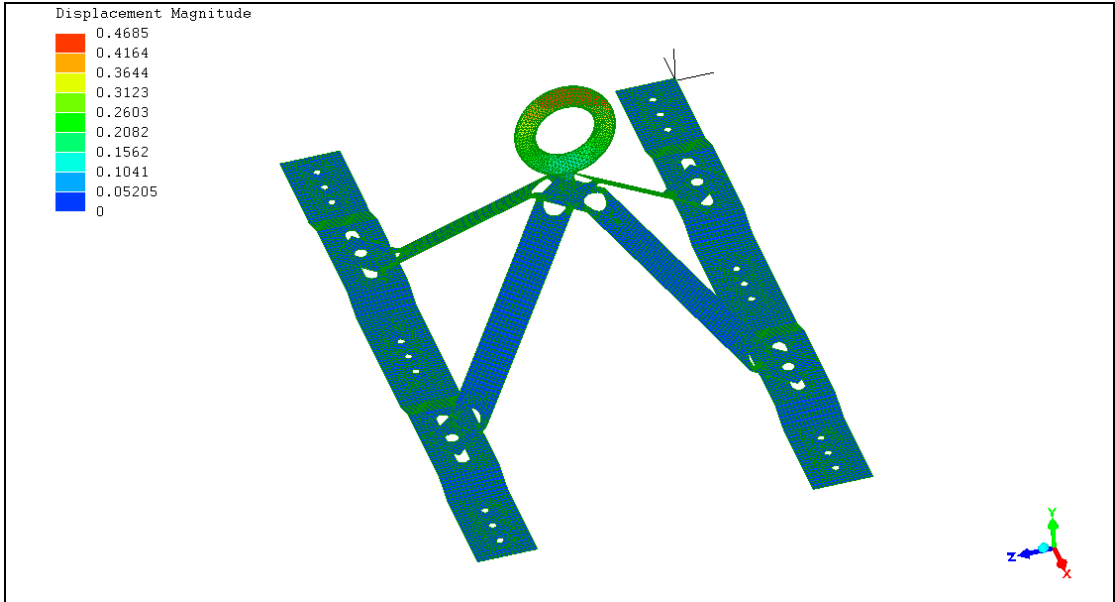
END ANCHORAGE POST



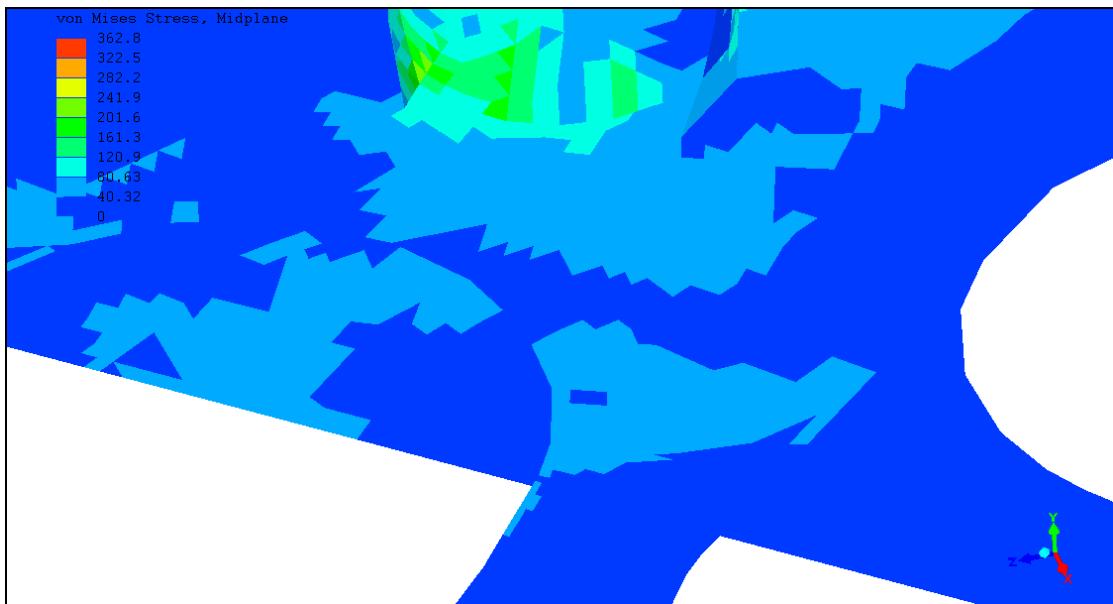
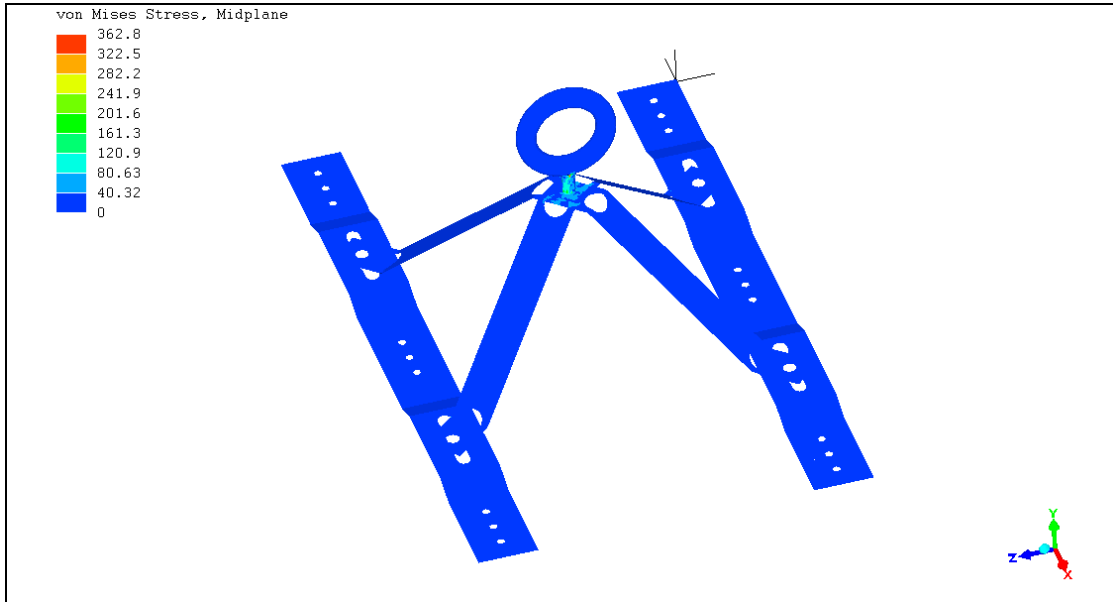
3D MODEL



FE MODEL WITH BOUNDARY CONDITIONS AND LOADS



MAXIMUM DEFORMATION: 0.47 MM





RESULTS SUMMARY

Sl.No.	Description	Deflection(mm)	Stress(MPa)
1	Start Anchor Post	0.46	117(353)
2	Intermediate Anchor Post	1.67	182(548)
3	Corner Anchor Post	2.56	214(482)
4	End Anchor Post	0.47	121(363)

Maximum Deformation and Stresses are within allowable limits.