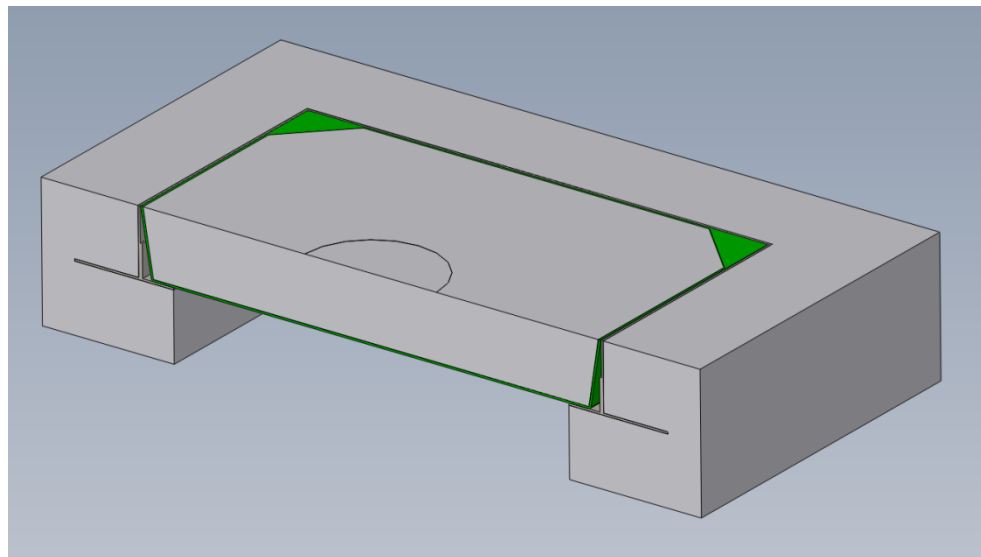
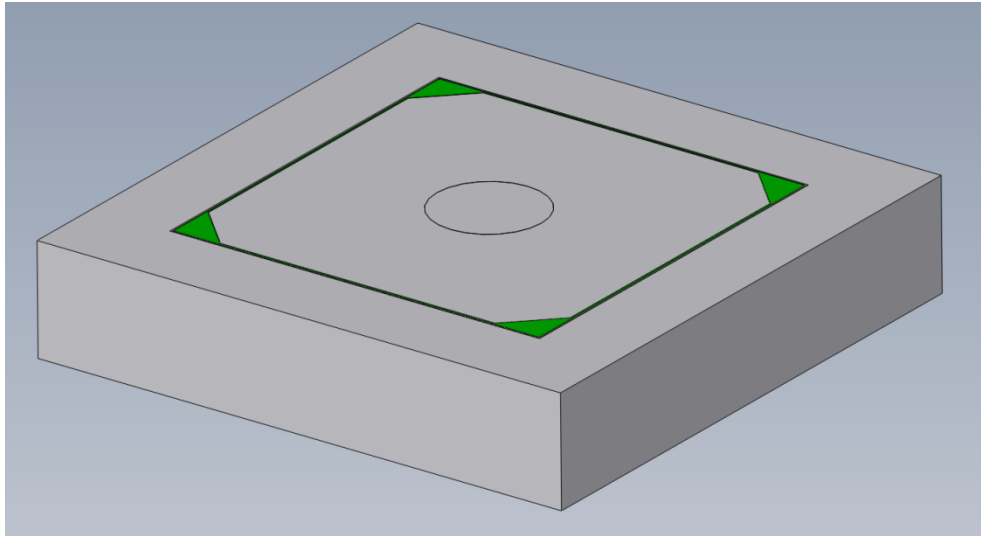


Title:

Analysis of Wunder Cover - WC70-70D

Client Details:

Advanced Traffic Supplies Ltd
1108 Wainui Road Advanced Traffic Supplies Lt
RD2
Opotiki
New Zealand



Note:

Do not base your design decisions solely on the data presented in this report. Use this information in conjunction with experimental data and practical experience. Field testing is mandatory to validate your final design.

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Assumptions

Fabricated components are treated as homogenous. All mating joints are considered fully welded.

Properties of concrete used: Modulus of Elasticity:17GPa - Poissons Ratio:0.22.

Concrete homogenous with no voids

Cover centrally loaded - 206kN over 200 mm dia. area.

Material Properties

Material name:	[SW]AISI 316 Stainless Steel Sheet (SS)
Description:	
Material Source:	
Material Model Type:	Linear Elastic Isotropic
Default Failure Criterion:	Unknown
Application Data:	

Property Name	Value	Units	Value Type
Elastic modulus	1.93e+011	N/m ²	Constant
Poisson's ratio	0.27	NA	Constant
Mass density	8000	kg/m ³	Constant
Tensile strength	5.8e+008	N/m ²	Constant
Yield strength	1.7237e+008	N/m ²	Constant
Thermal expansion coefficient	1.6e-005	/Kelvin	Constant
Thermal conductivity	16.3	W/(m.K)	Constant
Specific heat	500	J/(kg.K)	Constant
Hardening factor (0.0-1.0; 0.0=isotropic; 1.0=kinematic)	0.85	NA	Constant

Loads and Restraints

Fixture

Restraint name	Selection set	Description
Fixed-1 <Assem4^WC70-70D-1/Copy of Part2^Assem4_WC70-70D-1>	on 5 Face(s) fixed.	

Load

Load name	Selection set	Loading type	Description
Force-1 <Assem3^WC70-70D-1/Copy of Part3^Assem3_WC70-70D-1>	on 1 Face(s) apply normal force 2.06e+005 N using uniform distribution	Sequential Loading	

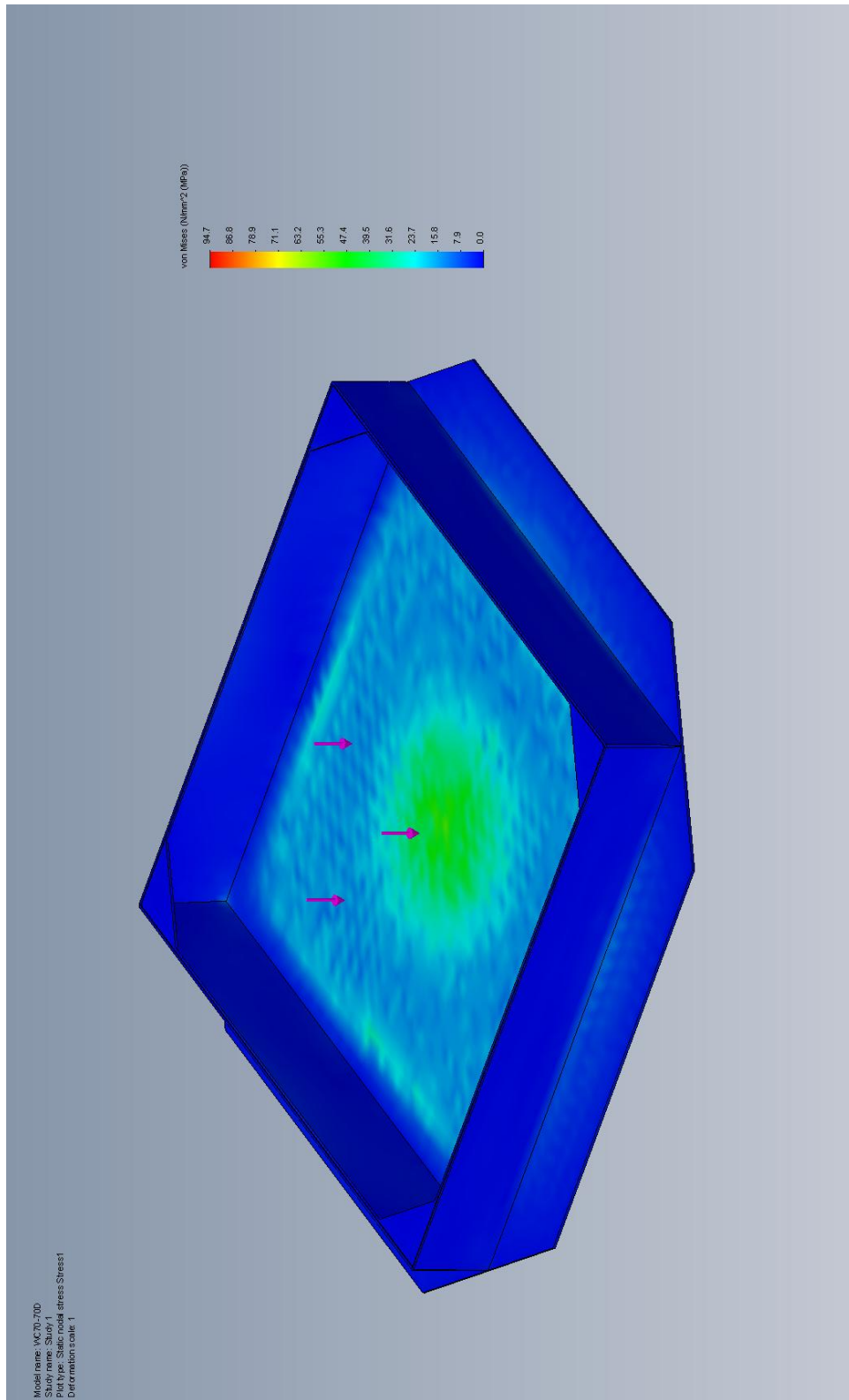
Mesh Information

Mesh Type:	Solid Mesh
Mesher Used:	Standard mesh
Automatic Transition:	Off
Smooth Surface:	On
Jacobian Check:	4 Points
Element Size:	27.17 mm
Tolerance:	1.3585 mm
Quality:	High
Number of elements:	71429
Number of nodes:	107677
Time to complete mesh(hh:mm:ss):	00:00:08
Computer name:	XW4600

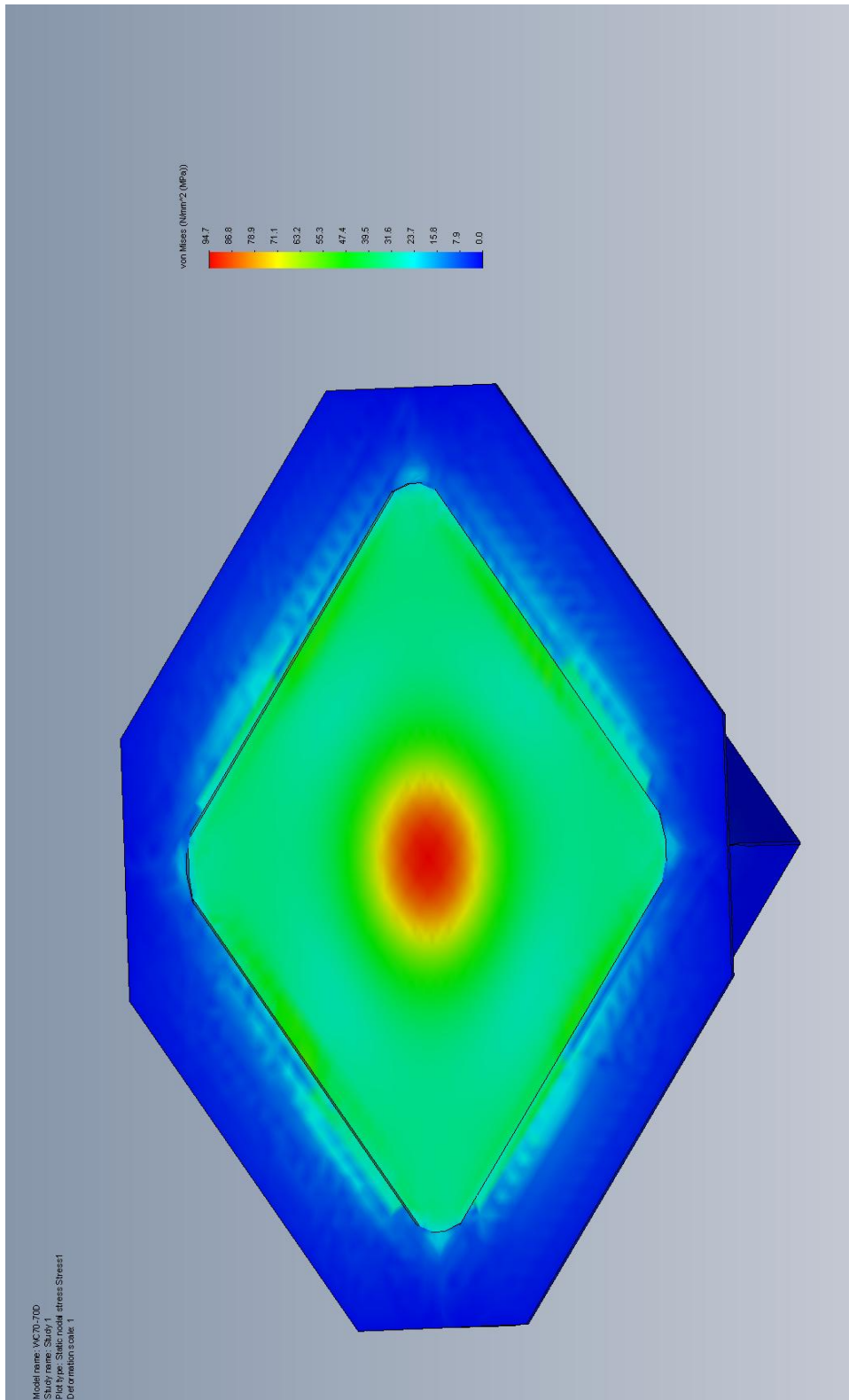
Study Results

Test Results

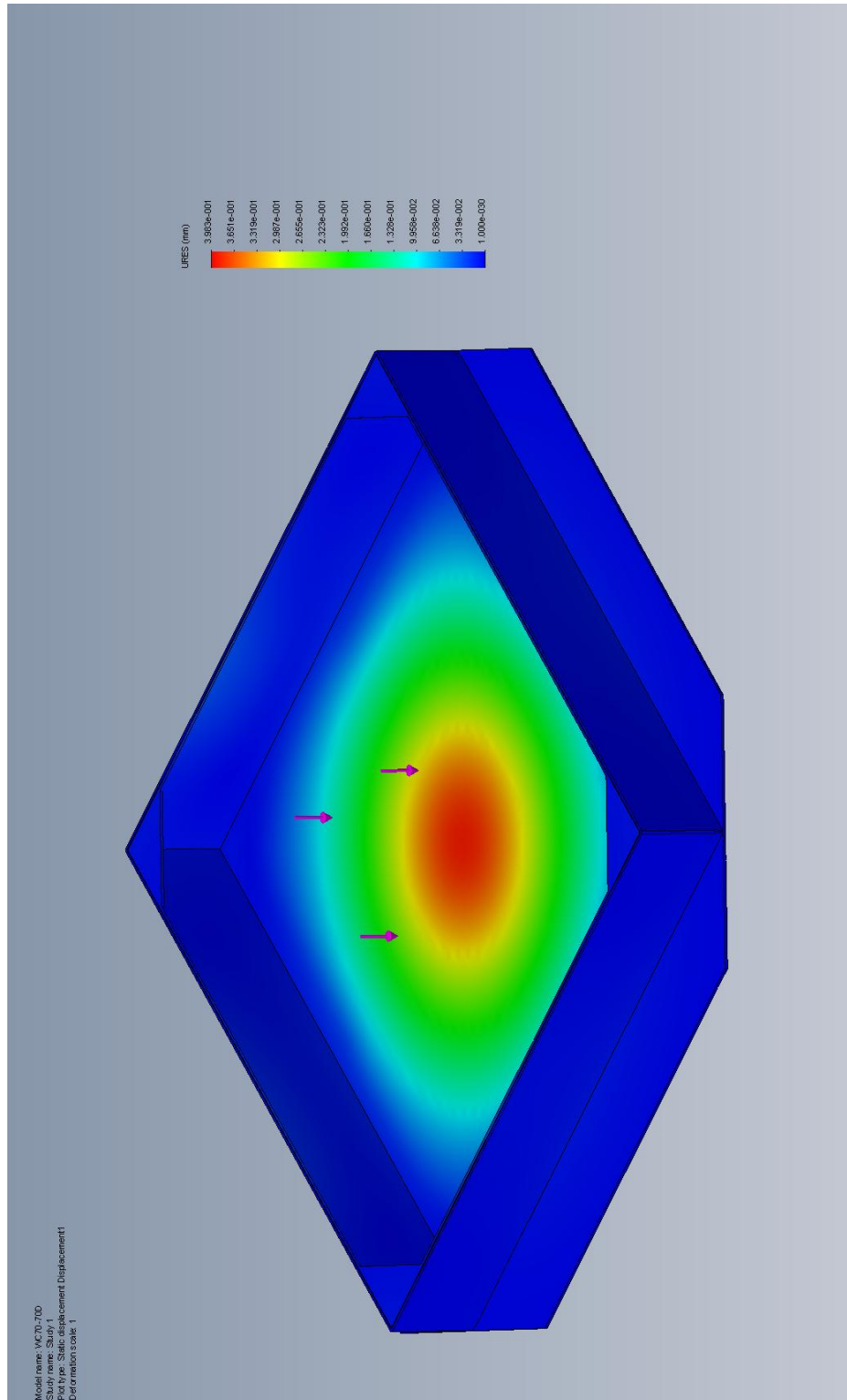
Name	Type	Min	Location	Max	Location
Stress1	VON: von Mises Stress	0 N/mm ² (MPa) Node: 46469	(147.006 mm, 500 mm, -103 mm)	94.7336 N/mm ² (MPa) Node: 22731	(-352.994 mm, 0.000487151 mm, -0.38732 mm)
Displacement1	URES: Resultant Displacement	0 mm Node: 46424	(-852.994 mm, 500 mm, 97 mm)	0.398303 mm Node: 1541	(-358.359 mm, -0.000421336 mm, 96.7017 mm)
Strain1	ESTRN: Equivalent Strain	0 Element: 46849	(-846.238 mm, -493.243 mm, -96.75 mm)	0.00063197 Element: 37751	(-657.42 mm, 26.4608 mm, -9.27141 mm)



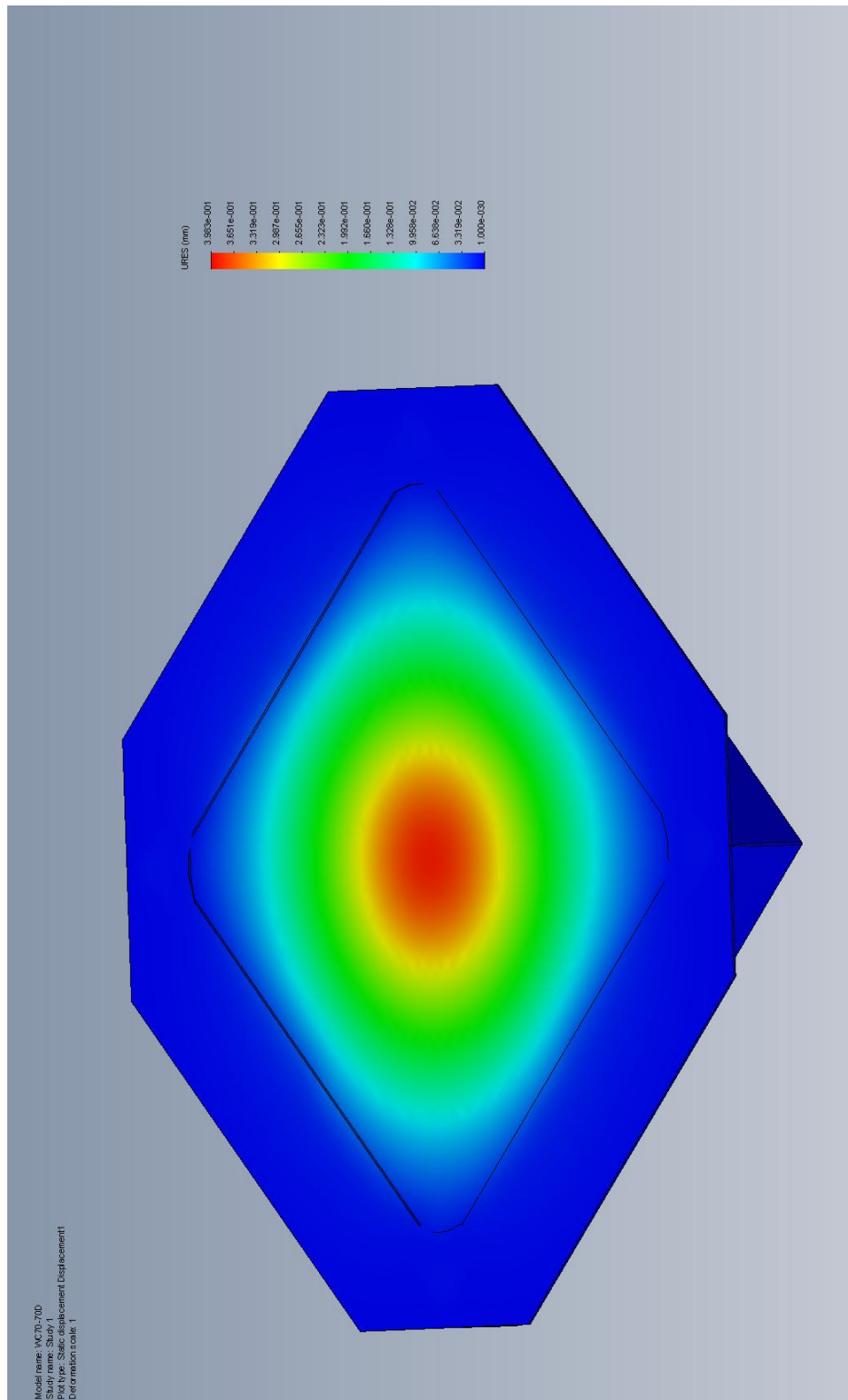
WC70-70D-Study 1-Stress-Top ISO View



WC70-70D-Study 1-Stress-Bottom ISO View



WC70-70D-Study 1-Displacement-ISO Top View



WC70-70D-Study 1-Displacement-ISO Bottom View

Conclusion

Results indicate that the sheet metal components are within the maximum working stress limits for 316 grade Stainless Steel. It should be noted that the results indicated are depended on the filling material being homogenous and with material properties similar to that of concrete. Any voids or cracking in the filling material render the results invalid.

The cover indicated a max stress value of 94.7MPa with a deflection of 0.39mm under max loading.