Conceptia®

Conceptia Software Technologies Pvt. Ltd.

Conceptia Engineering Service

www.cmtechno.in

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Description

Integrated Design & Manufacturing

Company Profile

1. Incorporated in the year 2004
2. An ISO 9001:2015 company
3. Experienced in providing engineering design solutions for Automotive, Medical, Defense, Consumer products, Pumps & Hydraulics, Process Plant equipment, Electronics, Heavy Equipment, Energy & Marine market.
4. Leading service provider of Basic Design & Detailed Designs for Shipbuilding and Oil & Gas industry
5. Awarded business excellence award in the year 2009
6. 800+ Qualified Technical Workforce
7. Offices at Delhi, Kochi, Hyderabad, Chennai

Organogram

DIRECTOR Marketing (Mr. Jithesh KA)

CKONNECT Product Sales (Mr. Jalil) COO

Sales & Tech Support

Allied Product Sales

Simulation-Analysis

HR (B Bhujabli) Accounts & Admin (Mrs. Anju)

CMTECHNO Engineering services (Cdr. MS Srikant)

SManager Engineering Services (Mr. Simon Anthony)

Support Service

Manufacturing

IETS (IETM & Analytics)

Mrs. Geeta Das

LIGHT LEADER (Solar Power)

Mr. Charan

MARINE (Ship & OffShore Structures)

Deputation Support (Mr. Sibi)

Naval Architecture (Mr. Prakash)

Engg & Outfitting (Mr. Soumik Mitra)

VERTICALS

Engineering Services
CMTECHNO

Analytical Simulation

- Strength Analysis
- Fatigue Analysis
- CFD based Thermal
- CFD Based Hydraulic Analysis
- Electromagnetic Analysis
- Shock & Vibration analysis
- Mold filling
- ASME & API based PV /Code design

Support Service

- CAD support
- Denovo design
- Re-Engineering
- Retrofit Engineering
- Test facility Design
- Deputation to client location
- Photorealistic rendering
- QA Services

Manufacturing

- 3D Printing
- Build to print
- Manufacture of designed products
- Ship repair
- AMC of manufactured and supplied equipment
- Indigenization support & manufacturing

Success Journey

During 17 years of experience, Conceptia has achieved outstanding success in the maritime industry. Backed by clients. Conceptia has emerged as one of the most successful engineering companies in India.

2004-2010

During the initial stage of startup conceptia has become a 9 crore corporate achieveing prestigious ISO9001 quality certification.

2010-2015

Captures 14% of Indian Naval Shipbuilding project. Receives prestigious orders from GRSE.

2015-2021

New Corporate Office Opens up at Silicon Valley of India. 1st large design & manufacturing order from Govt. (GTRE Test Rig)

Infrastructure

SL. NO.	DESCRIPTION	NUMBERS
1.	Workstations processor i3/i5/i7, RAM 16/32GB, 500GB/1TB HDD	80
2.	Laptops Processor i3/i5/i7, RAM 8/12GB, 500GB HDD	55
3.	6 Printers(2Nos All in One)	7
4.	IBM Rack Mounted 16GB RAM, 2 TB HDD, Xeon 5120 1.86 Ghz Processor	1
5.	Tower Mode servers 16GB RAM,2TB HDD,Xeon X3430 @2.40 Ghz Processor	1
6.	Highly secured Firewalls	1
7.	High Speed Internet Connected with Fiber Channel ACT, Airtel & BSNL	3
8.	Mail server through Cloud service	1
9.	O S OEM and Volume License(WIN 7/WIN8/8.1/WIN10 PRO)	135
10.	M S Office 2010/2013/Office 365	100
11.	AUTOCAD SOFTEARE LT and Full License	12
12.	Solid works Network License All Kind of Module Including Electrical	20
13.	Office Electrical power Running throught Solar power with 18KW producing	

Software Licence

CAD TOOLS	PURPOSE	LOCATION	NO. OF LICENCES
CADMATIC	Initial Structural Design, Complete Product Model & Production Data Extraction.	Conceptia	Leased on Requirement
PDMS	Equipment, Piping, HVAC, Electrical, Structure Modeling of Process/Power Plants & Offshore Structures.	Conceptia	Leased on Requirement
AVEVA MARINE	Initial Hull Design, Complete Product Model & Production Data Extraction.	Client's Location (ADSB, Abu Dhabi)	Leased on Requirement
FORAN	Structure Design.	Client's Location (DWD, Dubai)	Leased on Requirement
CADWIN	Nesting & Plate Cutting	Conceptia	1
AUTOCAD	2D Drafting & 3D Detailing	Conceptia	10+2
Pipe Flow Expert	Pressure Drop Calculation	Conceptia	1
Siemens NX	CAD/CAM/CAE	Conceptia	5+5
Siemens Team Centre	Product Life Cycle Management(PLM)	Conceptia	6
SolidWorks	CAD/CAM/CAE, Engineering Documentation Product data management	Conceptia	10

MAKING OUR ACQUAINTANCE

Our Focus – One Stop Solution For Engineering Services

SOUND INFRASTRUCTURE

1.Office Space – 80 Seats at Bangalore Engineering Design Center.

2.Strength: Trained 250 engineers on roll.

3.IT infrastructure - Modern workstation and licensed software with dedicated server.

4.Sound financial with ramp up capacity.

SENIOR PROFESSIONALS

From both the Naval and Commercial arena with sound business ethics and dedicated to clients in ship building and engineering Industry.

Experience & Staff Strength

Our Top Management’s Cumulative years in the Ship Building / Ship Repair Industry is proof of our commitment, expertise and the capability to take up a major responsibility such as Owner representation.

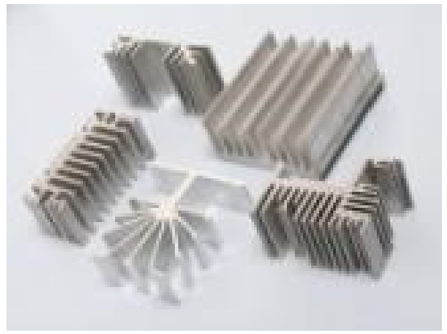
- Senior Management staff from reputed Shipyards
- Marine Engineers
- Naval Architects
- Project Managers
- Design Engineers
- Trade specialists

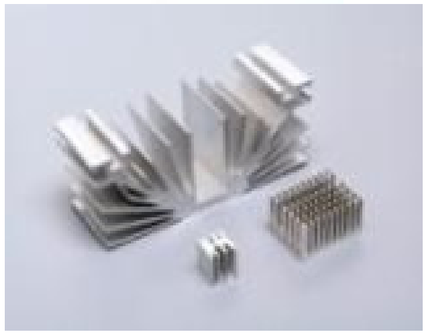
ENGINEERING PROWESS

THERMAL ANALYSIS

CASE STUDIES (Defense order contact person details appended)

1. Heat Sink Analysis.
2. Thermal Analysis of heat emission of radio set-(Directly conducting to body).
3. Compartment level heat analysis
4. Thermal analysis of Micro wave oven –Client Dynamo USA-Aviation
5. Temperature distribution in Power amplifier cabinet- Indian Navy
6. Board Level system level and module level analysis of circuits- SFO Technologies
7. Hand held device-Thermal analysis.
8. Cooling/ HVAC-Thermal Analysis.
9. Heat transfer through radiation shields.
10. Lab building model-Thermal analysis.

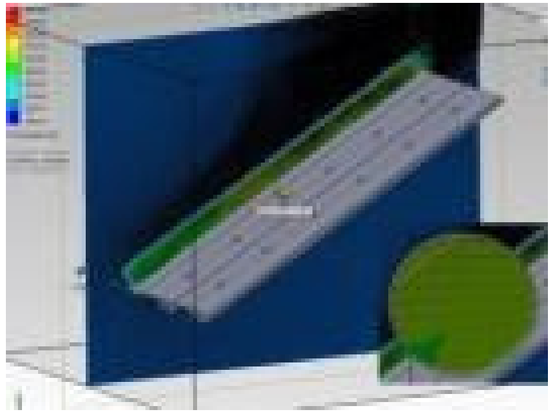


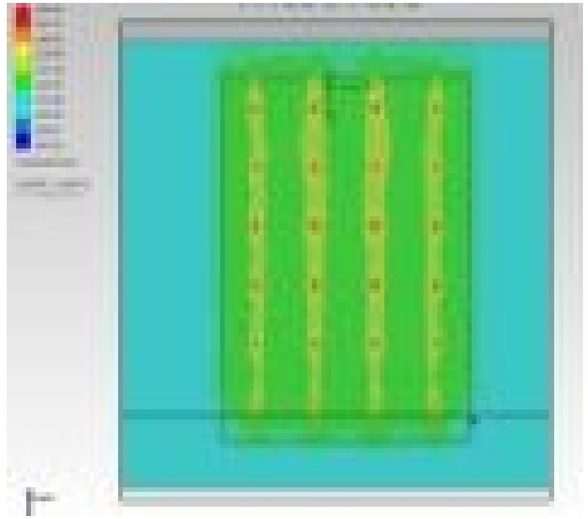


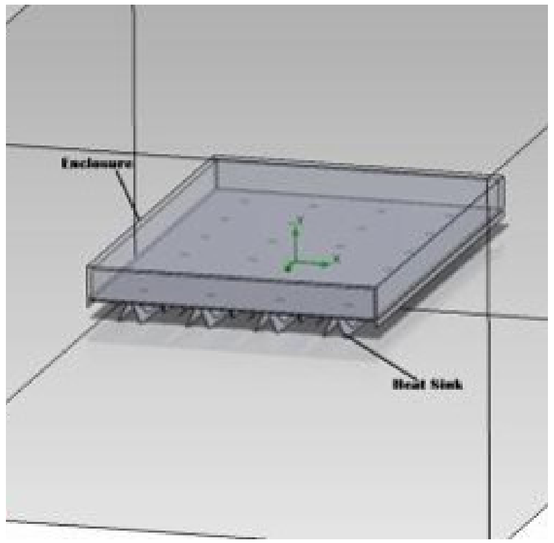
HEAT SINK ANALYSIS

APPROACH

- Thermal analysis of Aluminum heat sink having large number of IC connected to it by Conduction as all the ICs are bonded to the heat sink using an interface material and placed inside a plastic Enclosure.
- Heat carry away from heat sink by natural convection in the enclosure.
- Heat from source to sink by conduction and heat loss from sink to environment by convection.
- Combination of convection currents / flow and conduction employed.
- Heat dissipation from adjoining PCB surfaces also considered.



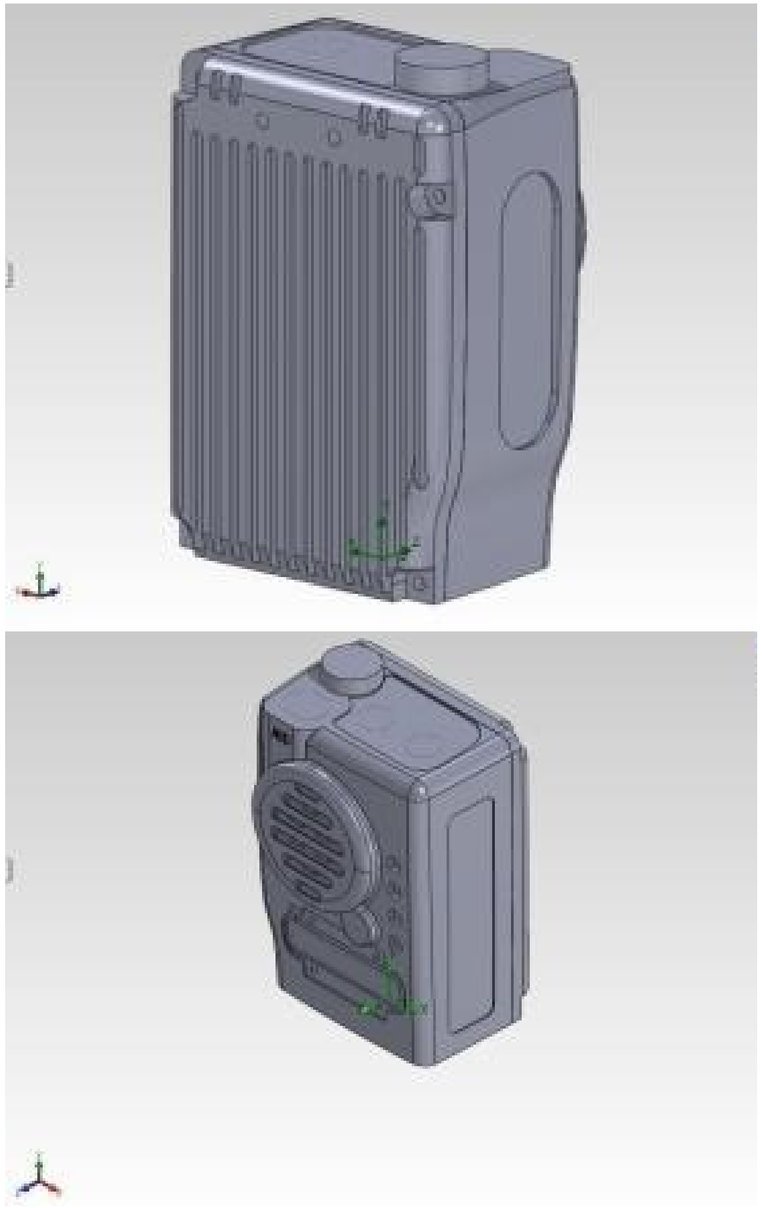




THERMAL ANALYSIS

RESULTS

- It was seen that most of the heat was being dissipated from the heat sink and not from the IC or the PCB.
- The natural convection patterns were also clearly visible and based on which enclosure was designed to carry away heat.
- The maximum temperature raise of the IC/ source predicted using the flow cum conduction was also close to the experimental value. (deviation of 5%).
- This validated the model and approach paving way for safe prediction of temperatures of components and assured performance.



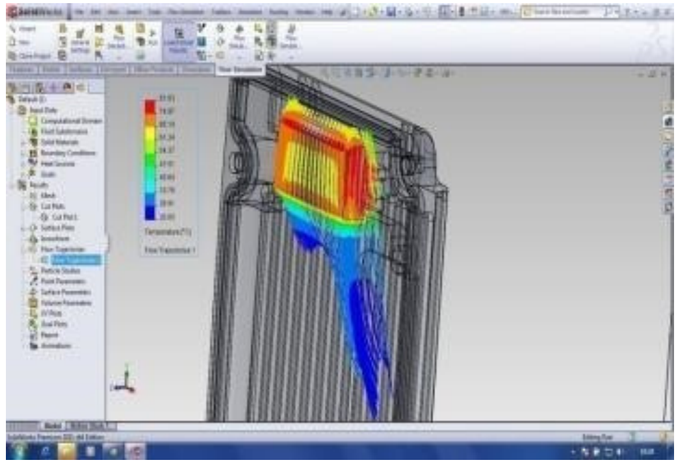
2. Thermal Analysis Radio Set

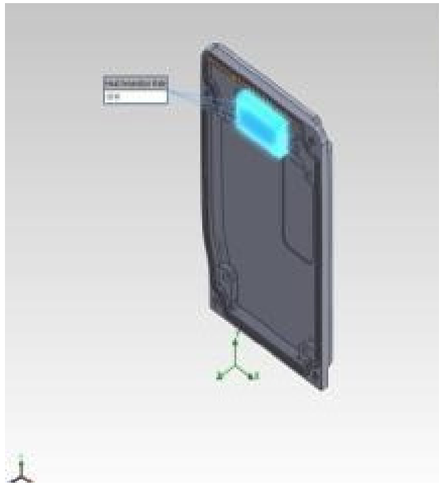
Project Objectives - Design of Equipment Enclosure

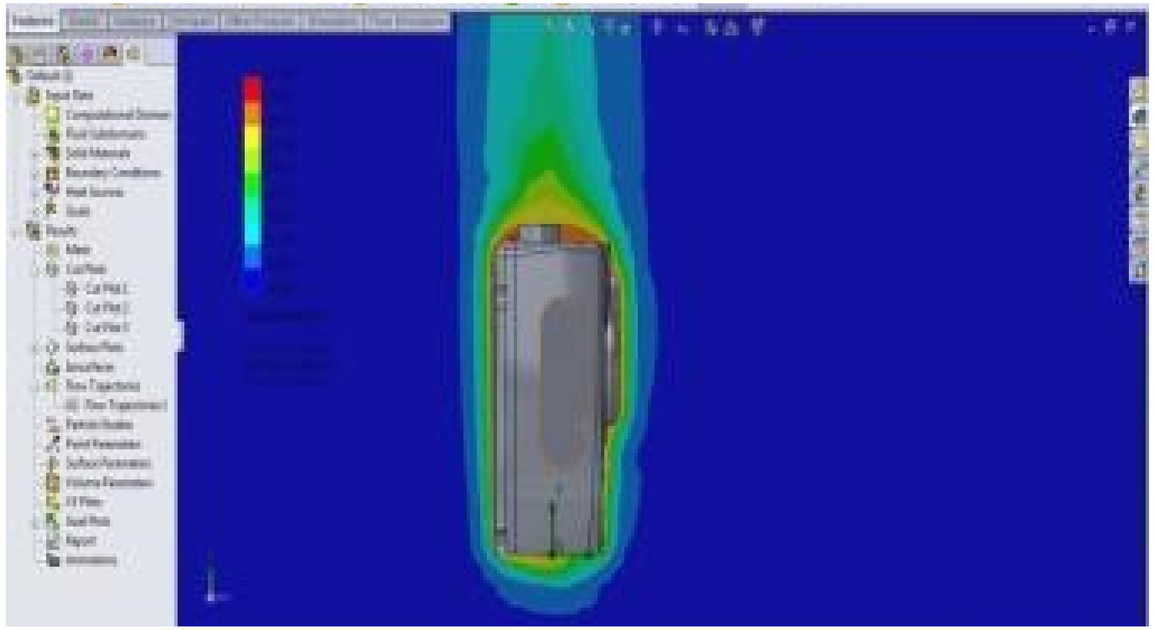
- Design of heat sink by way of providing fins to the rear end cover.
- Assessment of internal temperature raise.(limit 1100C for given ambient of 500C
- The temperature near the component is to be maintained less than 110 deg c.

Approach

- To arrive at the profile of Temperature Vs Time in both heating and cooling mode as the equipment works on “ON-OFF” cycle of 3:9 minutes.
- Assessment of heat generated in 3 minutes and design of heat dissipation during off cycle of 9 minutes.
- Assessment of residual heat in follow on cycle due to thermal capacitance.



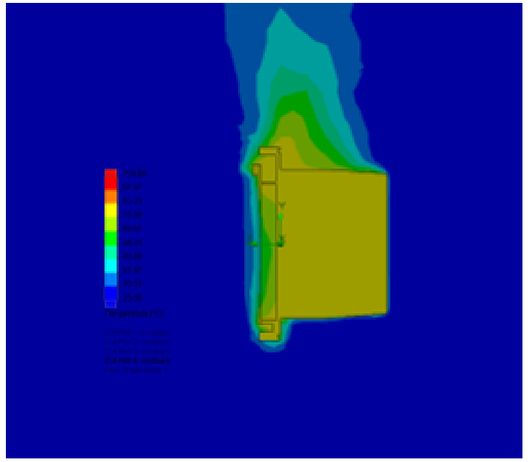


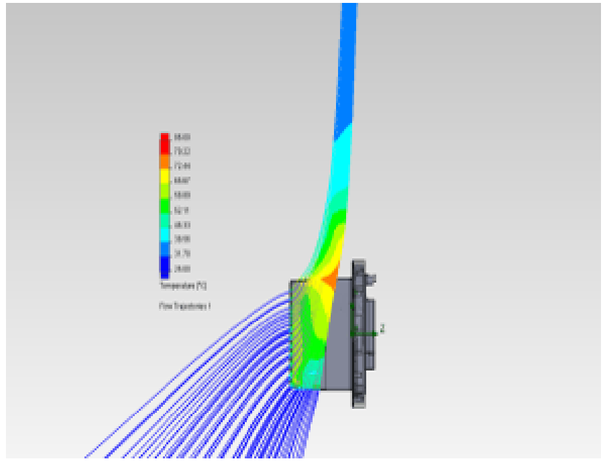


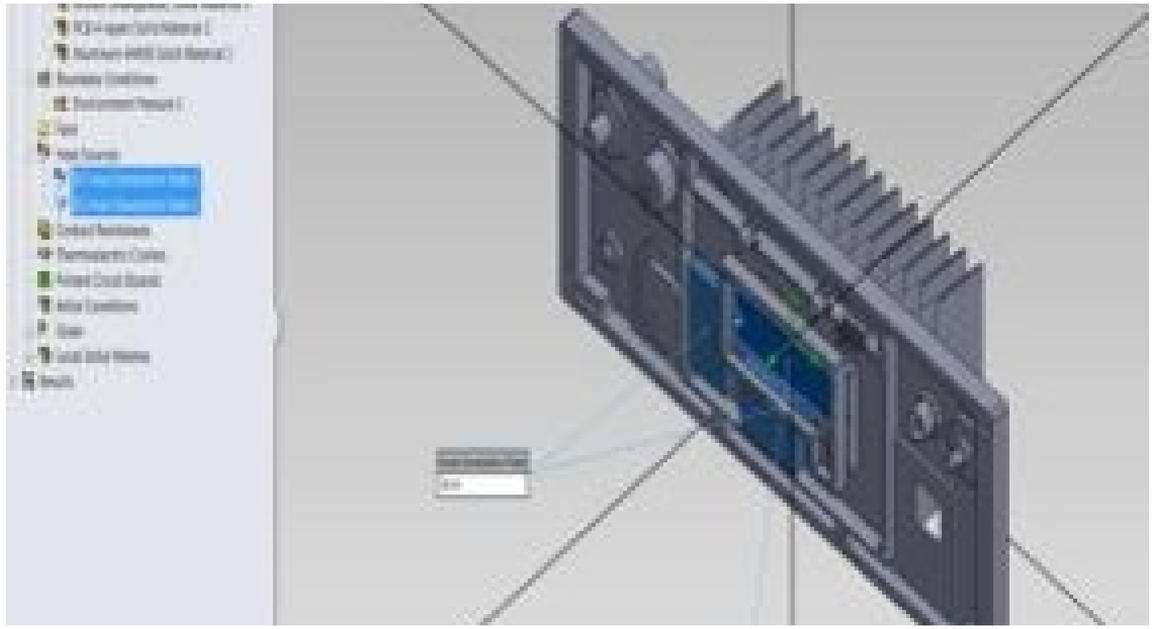
Thermal Analysis Radio Set

Results (Analysis):

- The maximum temperature was 38 deg c during the ON-OFF cycle of 3:9 operation.
- During constant operation the maximum temperature estimated was 86 deg c with 250 C ambient.







Thermal Analysis Radio Set

Results Post Re-Design:

- Square Fin heat sinks running along the back cover gave the best performance in terms of heat carry away. BEL proposed pin type was found to be inadequate.

- Increase of Fin density was not feasible and therefore fins were extended to full length on back cover (from 15 to 30 cms) and with this the temperature was observed to be within permissible limits.

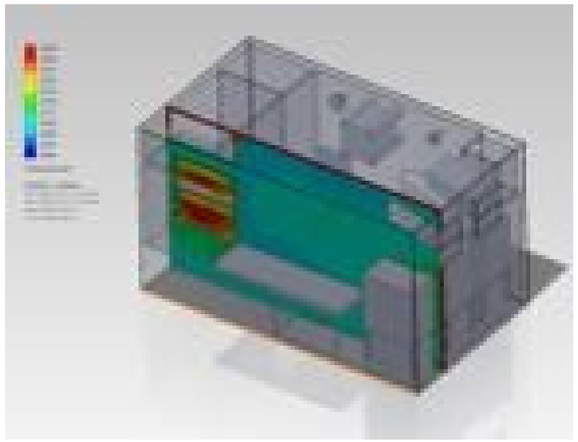
3. Thermal Load Analysis Compartment Level

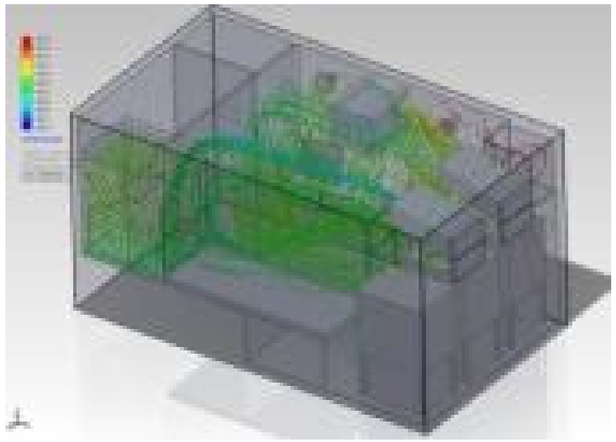
Results Post Re-Design:

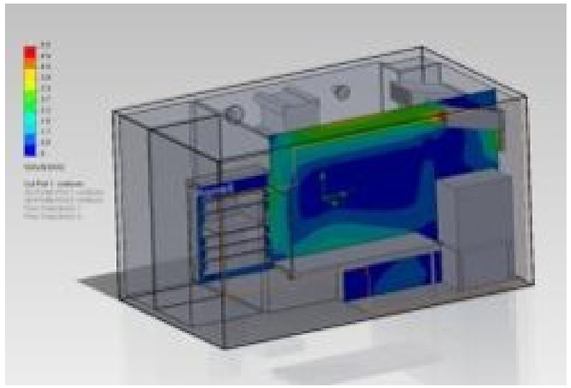
- Conceptia is closely associated with Defence and has been meeting the varied needs of defence requirements.
- A radio enclosure analysis to meet the extreme harsh environments of Thar desert (-5 deg C to+55D eg C) was undertaken to assess optimal cooling/heating requirements.

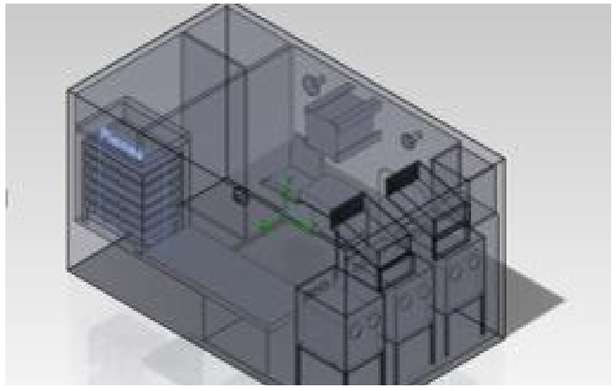
1.Project Objectives – Radio Enclosure

- Prediction of air temperature in a Radio communication shelter for a given tonnage of A\C. Limiting air temperature to 40 deg c with outside /ambient at about 550C.
- Assessment of need for internal circulation fans.
- Assessment of heat ingress from outside environment in to radio enclosure and temp distribution across enclosure wall.









Thermal Load Analysis Compartment Level

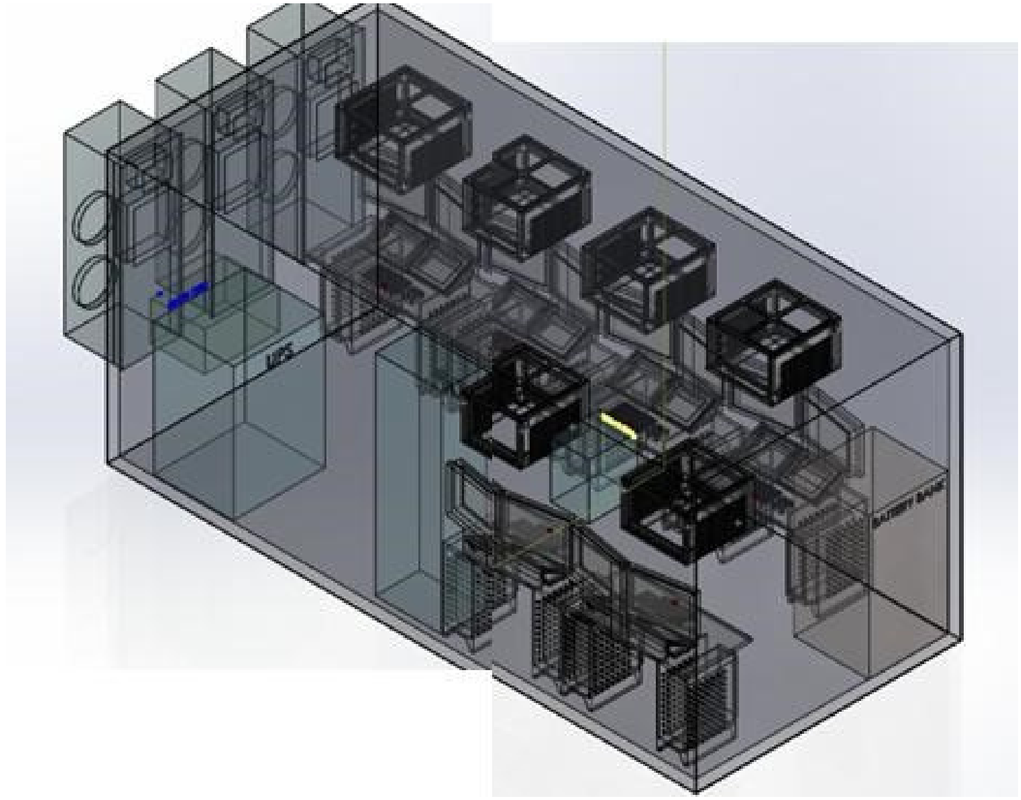
Results:

- Existing Tonnage of A\C was not sufficient to maintain the temp.
- Additional A/C unit called for scarce resource namely power supply there by bringing down endurance.
- Air flow analysis was therefore carried out and it showed irregular air distribution with hot air pocket formation.
- Low power internal circulation fans were located at air pocket areas and this radically improved internal air circulation without interruption.
- This brought down internal temperature to **agreeable values without increase in AC tonnage.**

Building Level Thermal Analysis

Aim: On the basis of human comfort level, understand the temperature profile inside a cabinet equipped with electronic components.

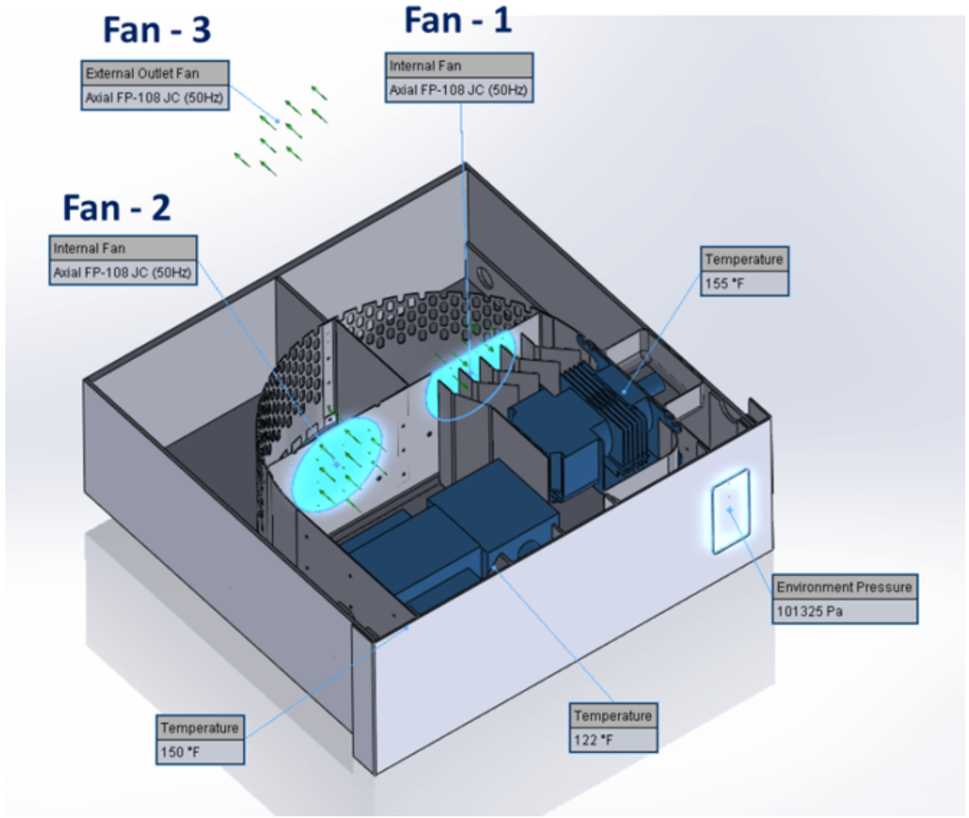
Model Overview:



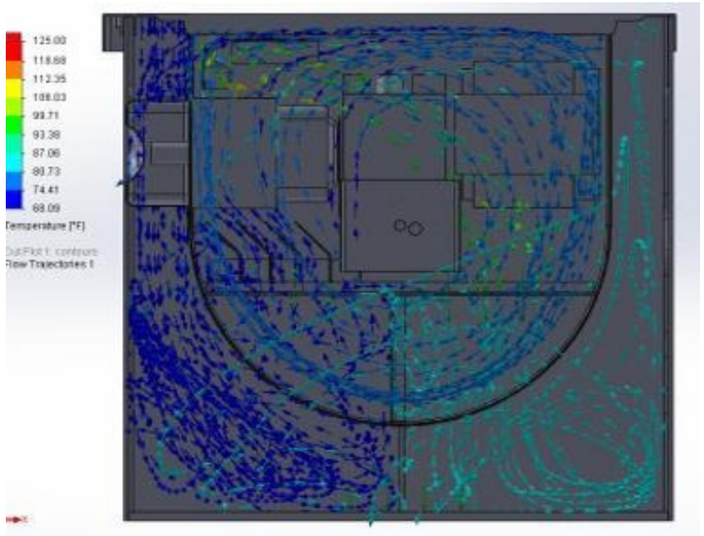
4. Micro Wave Oven

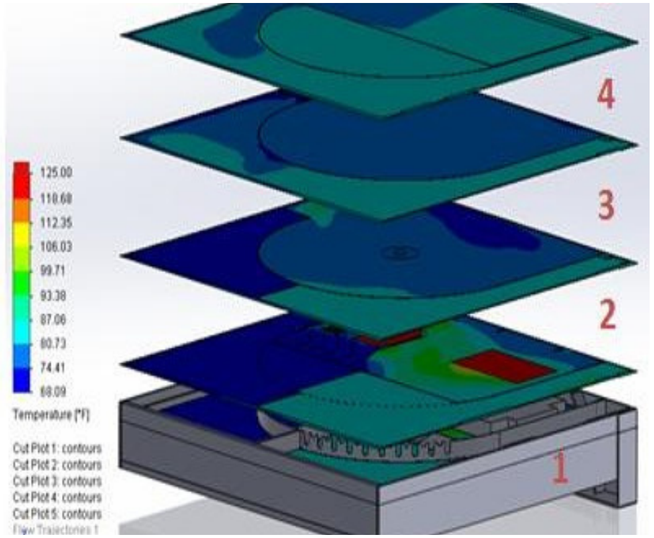
Aim: Understand the air flow, temperature distribution, fan efficiency and optimize the design based on the results for Airborne /Aircraft application to meet federal aviation standards.

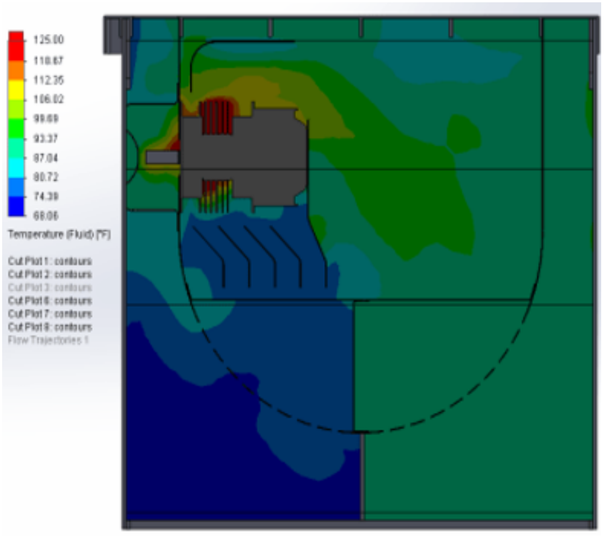
Model Over view& BC

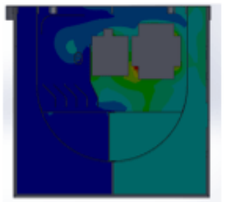


Temperature Plots





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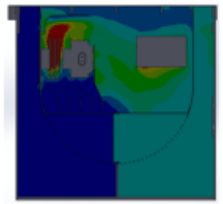
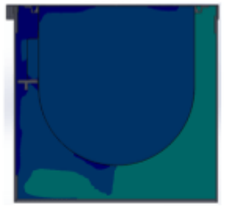

Section - 2


Section - 3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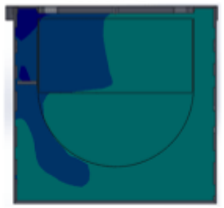
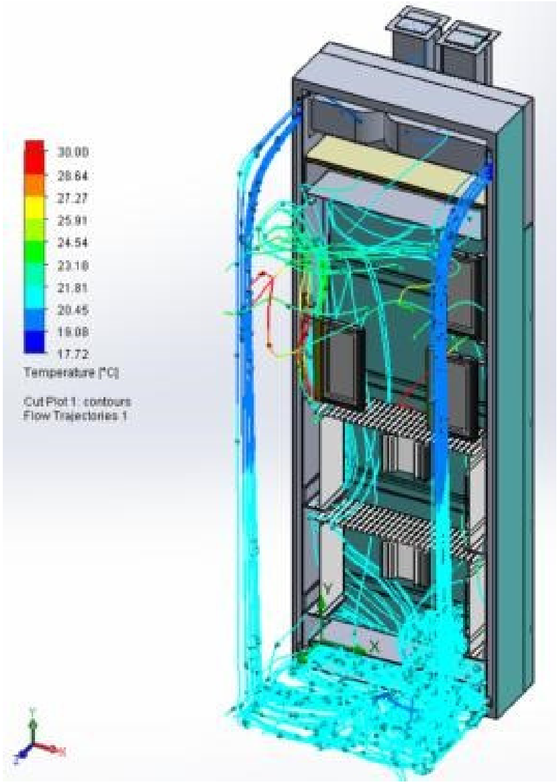
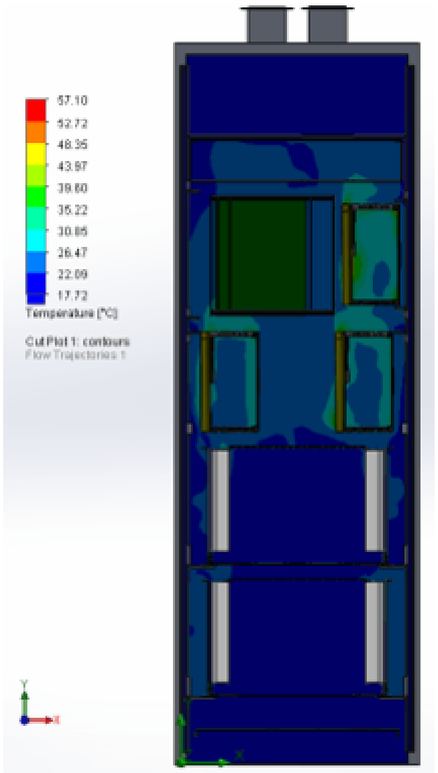
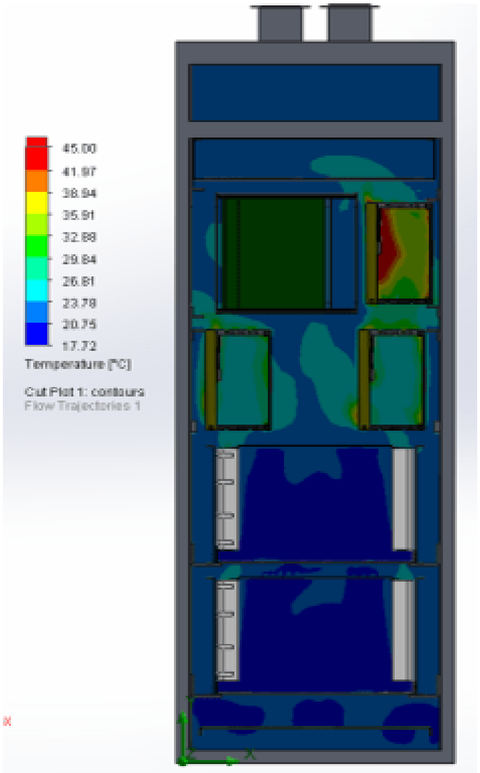

Section - 5

Temperature Plots

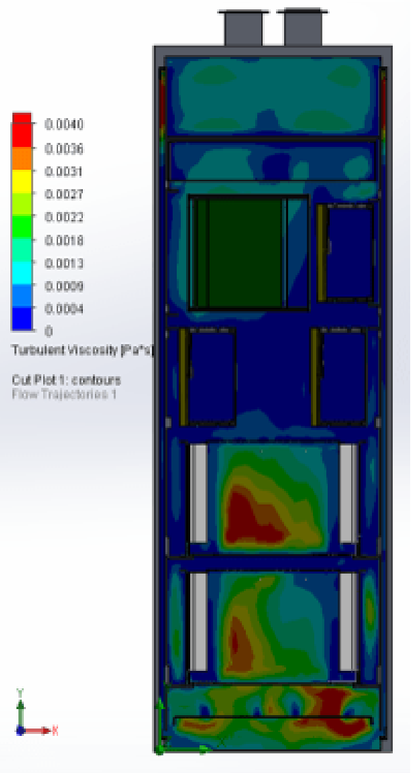


Temperature Flow trajectory



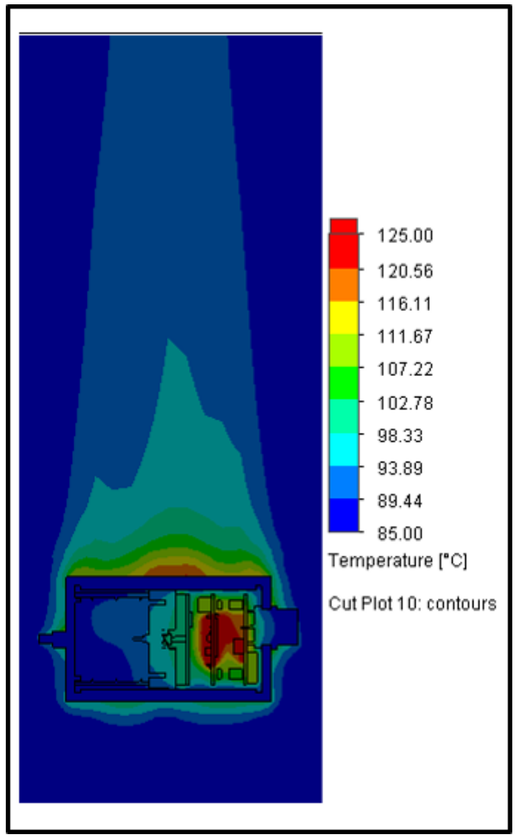


Temperature distribution at different level of the system

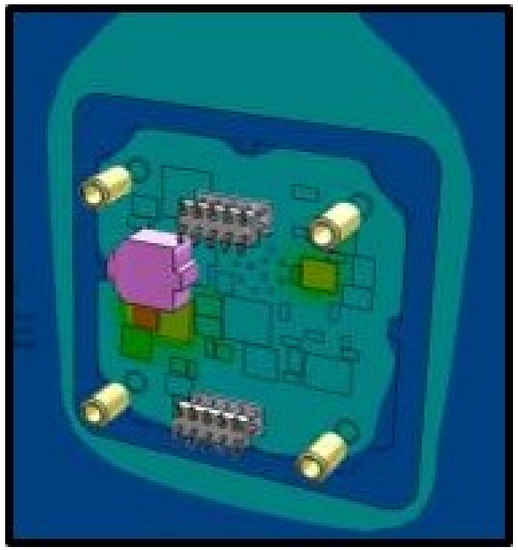


Turbulent viscosity

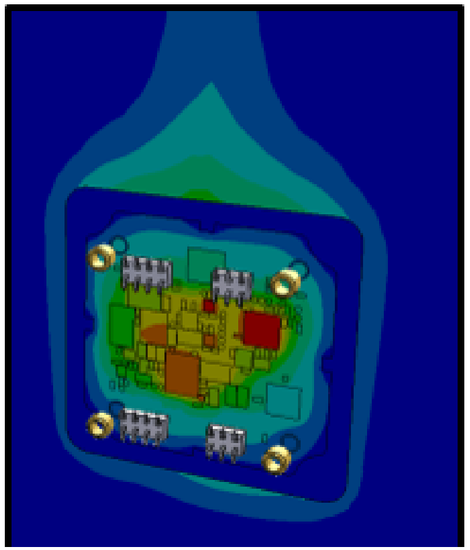
6. Temperature Plots Board Level



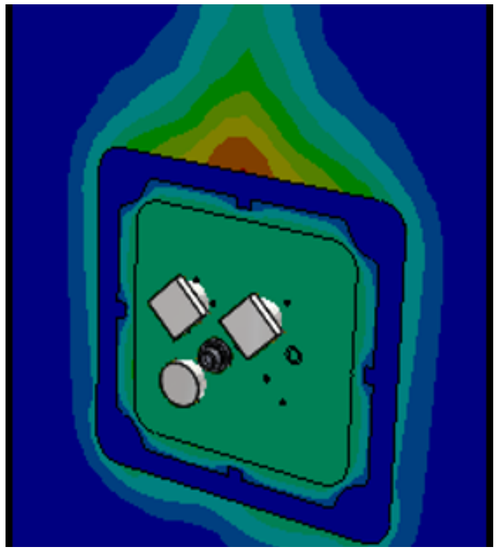
Temperature plot



LD PD
Temperature plot



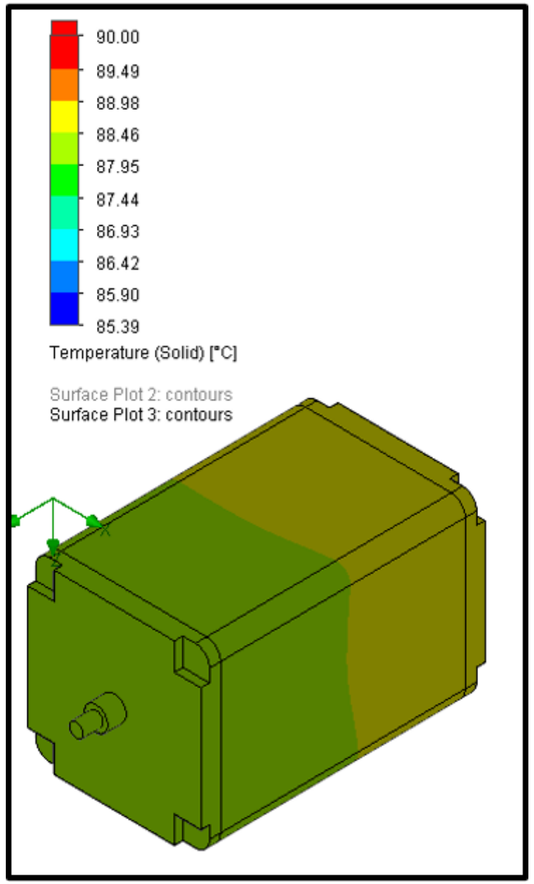
MCU
Temperature plot



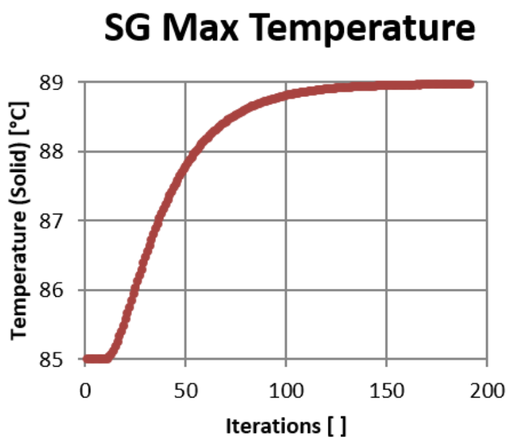
Power Board
Temperature plot

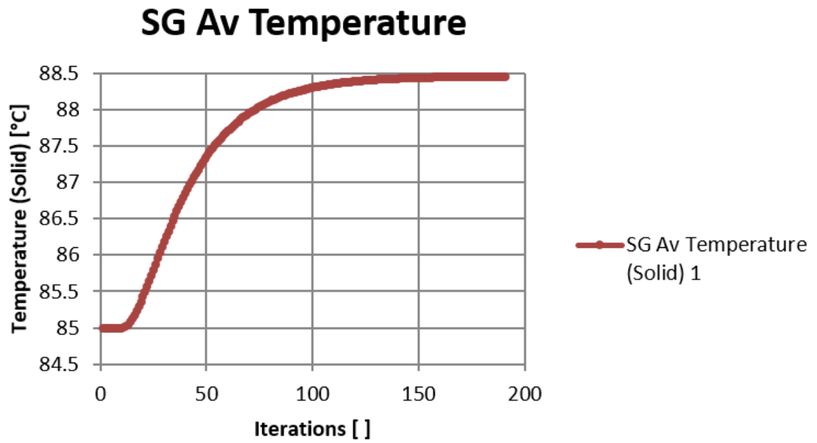
Skin-Temperature

Enclosure Temperature plot



Max enclosure temperature 88.87 deg C at converged condition

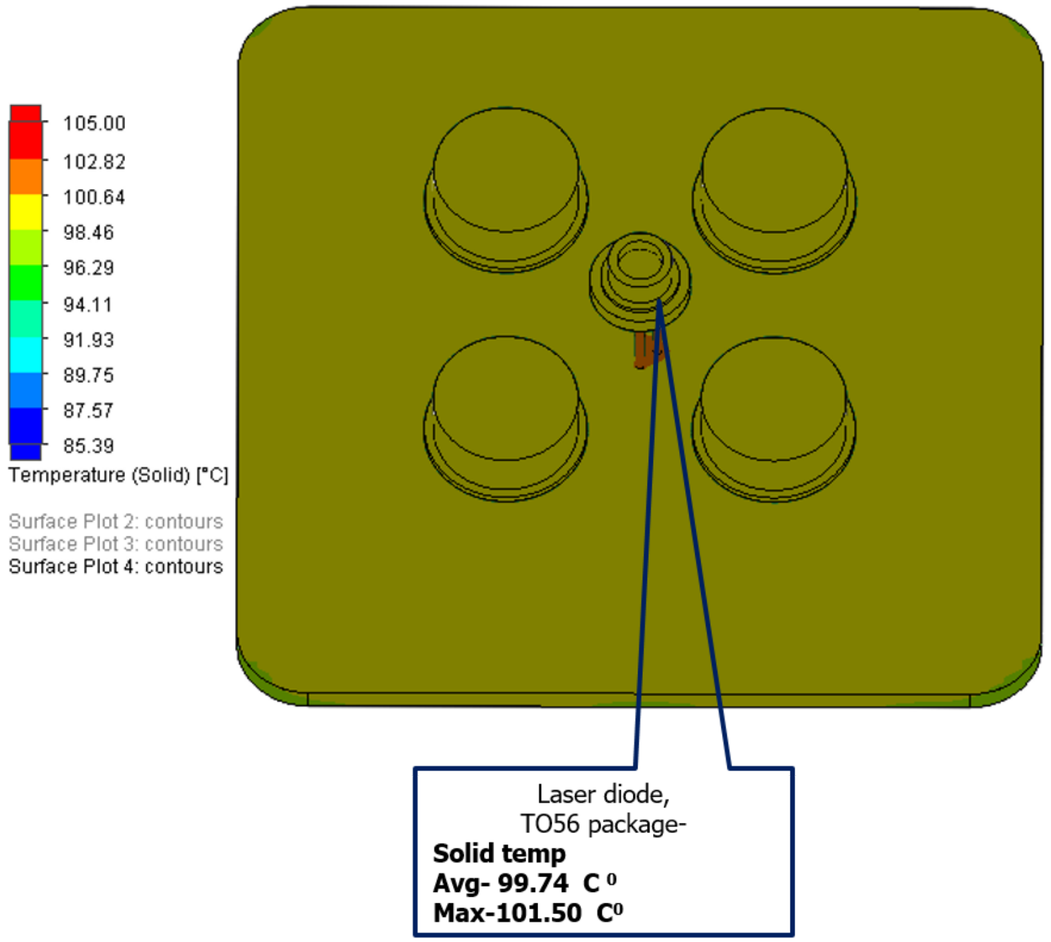




Goal Name	Unit	Value	Averaged Value	Minimum Value	Maximum Value
SG Av Temperature (Solid) 1	[°C]	88.46	88.43	88.36	88.46
SG Max Temperature (Solid) 1	[°C]	88.98	88.95	88.87	88.98

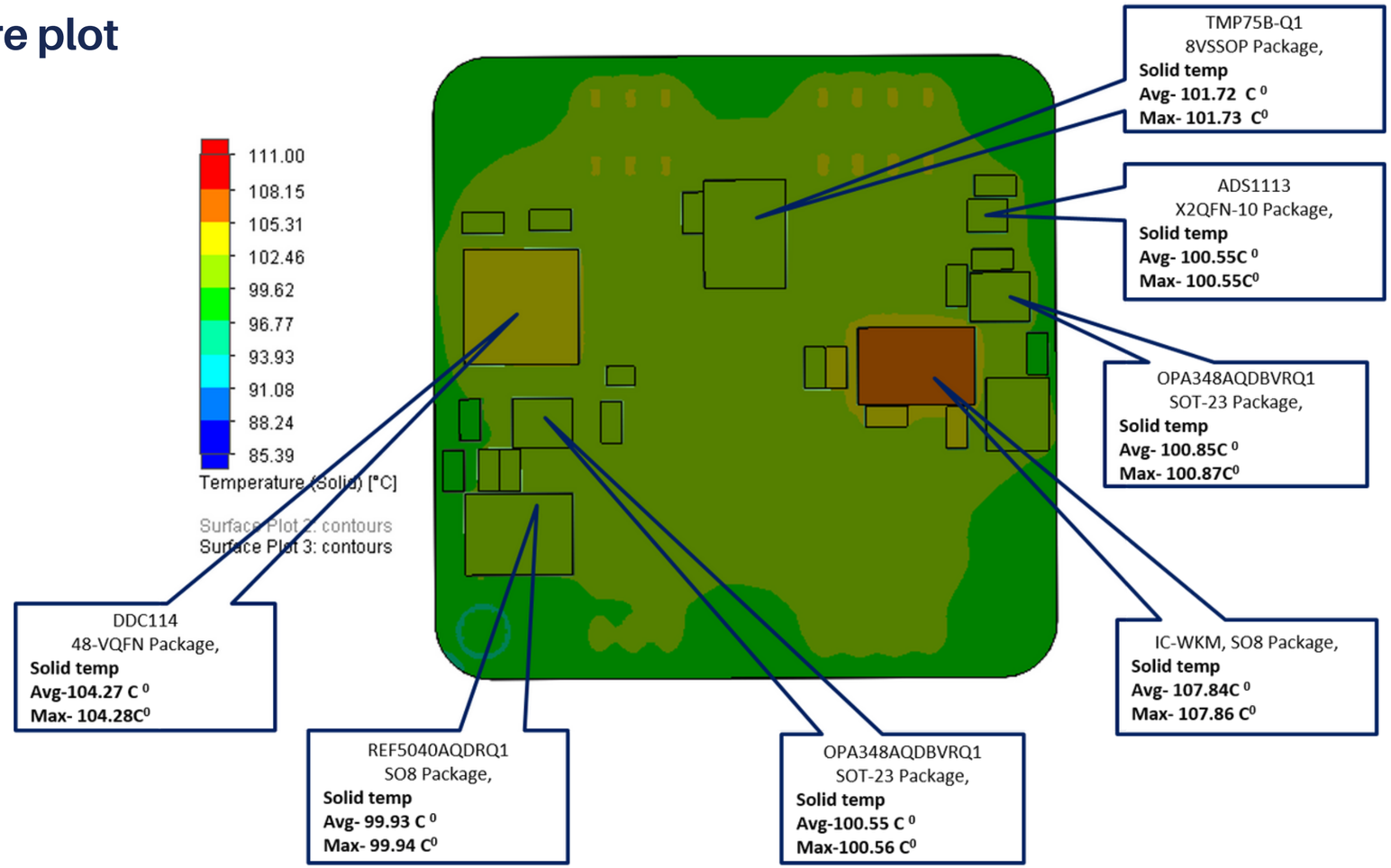
LD PD Board Top - Chip Level Temperature

Temperature plot

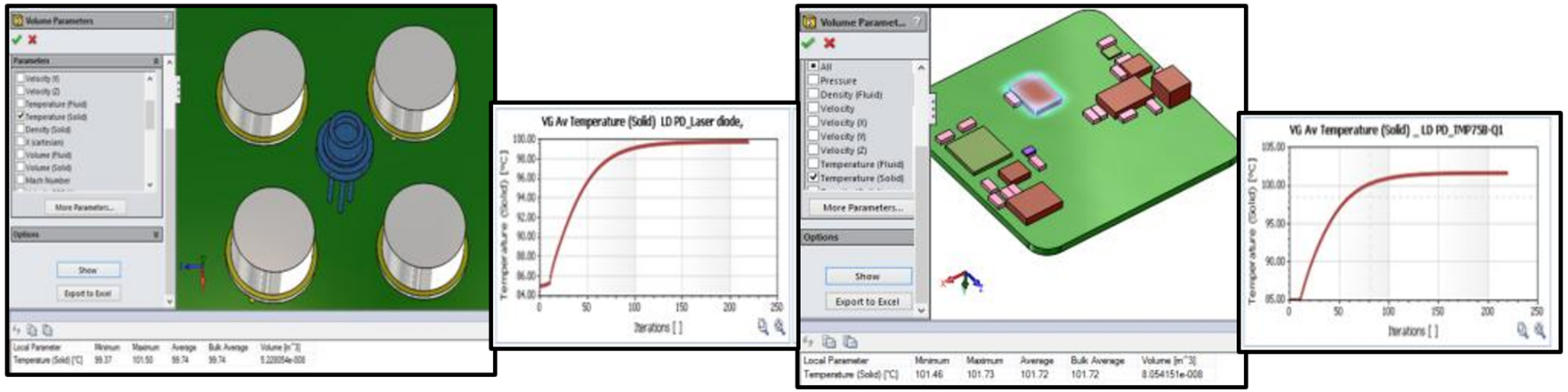


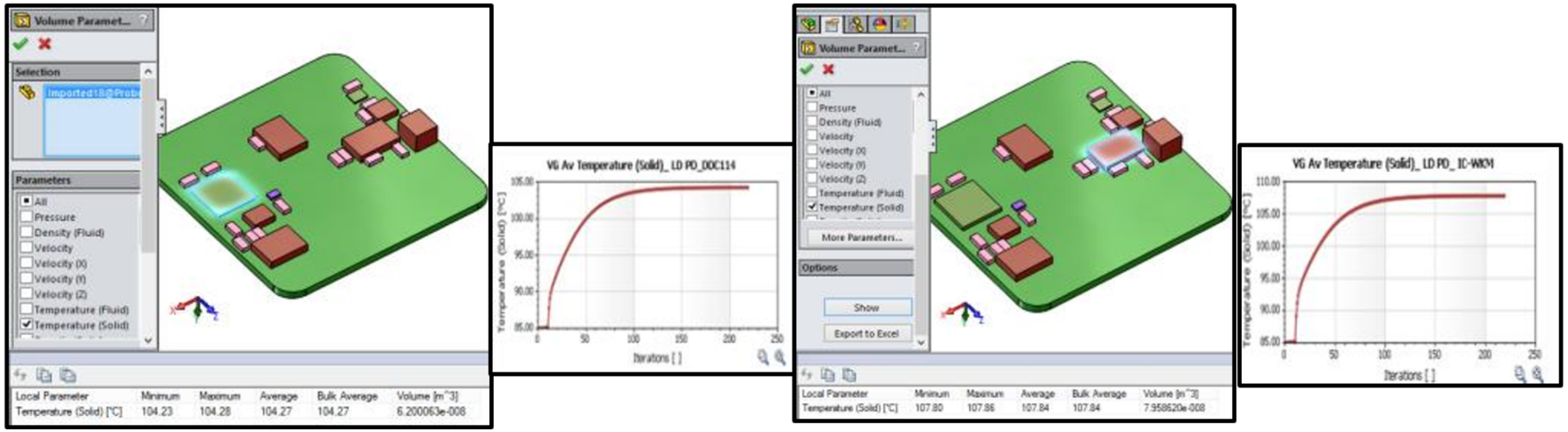
LD PD Board Bottom

Temperature plot



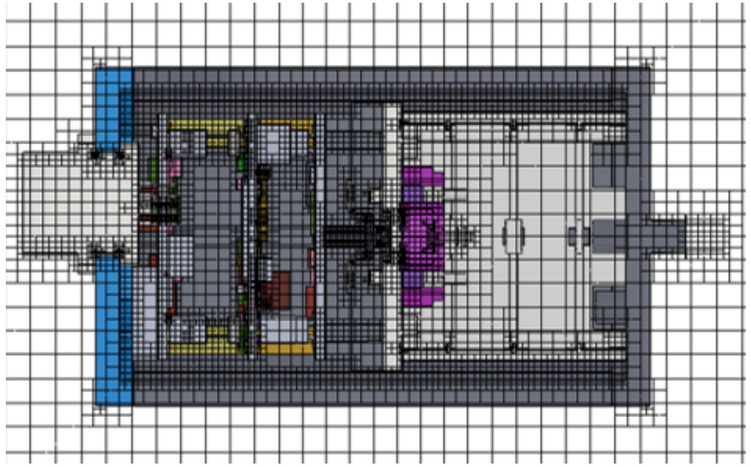
LD PD-Software Output

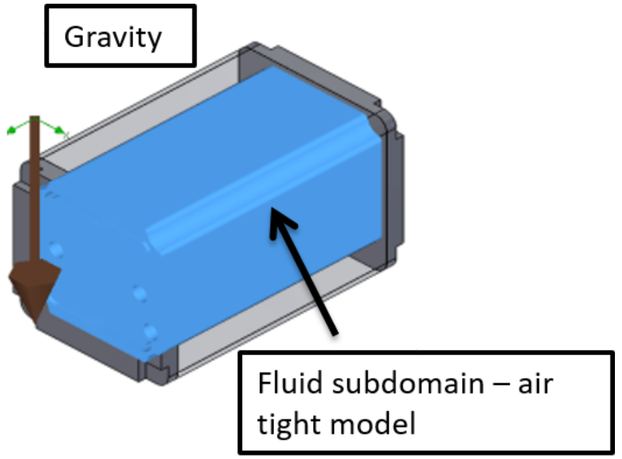




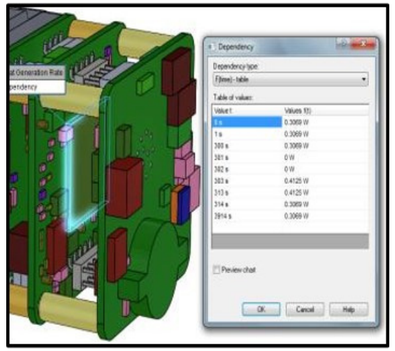
Boundary Conditions

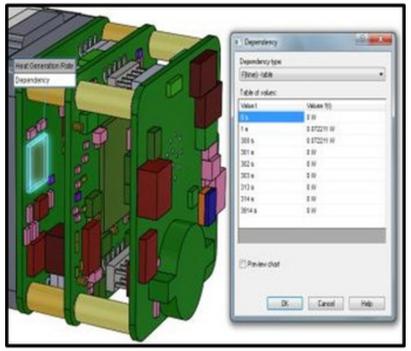
Fluid Mesh

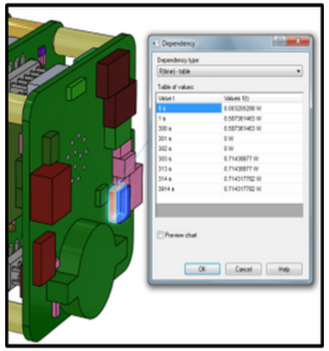




Time dependent value for the chips - Transient Input

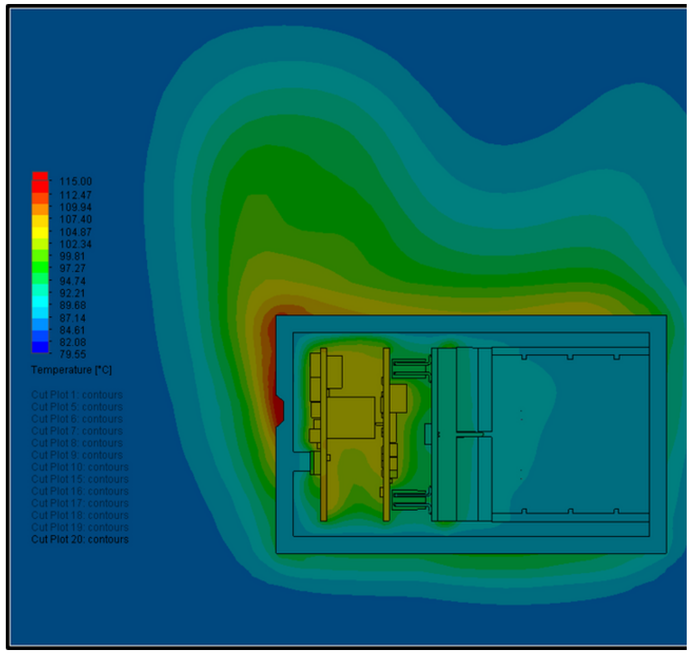






System Level Temperature Plots

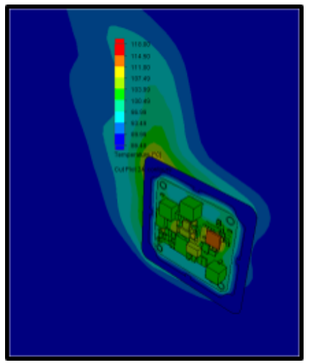
Temperature plot



Temperature scale set as 115C

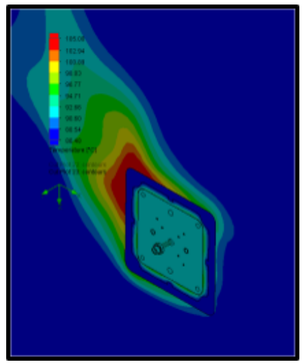
LD PD

Temperature plot

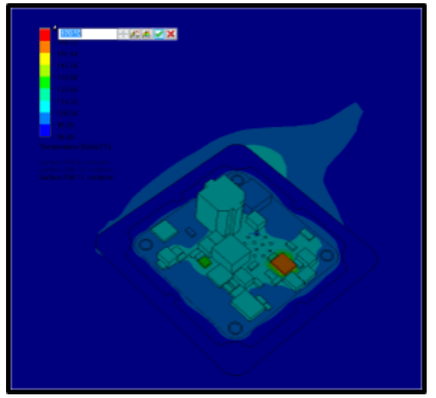


MCU

Temperature plot

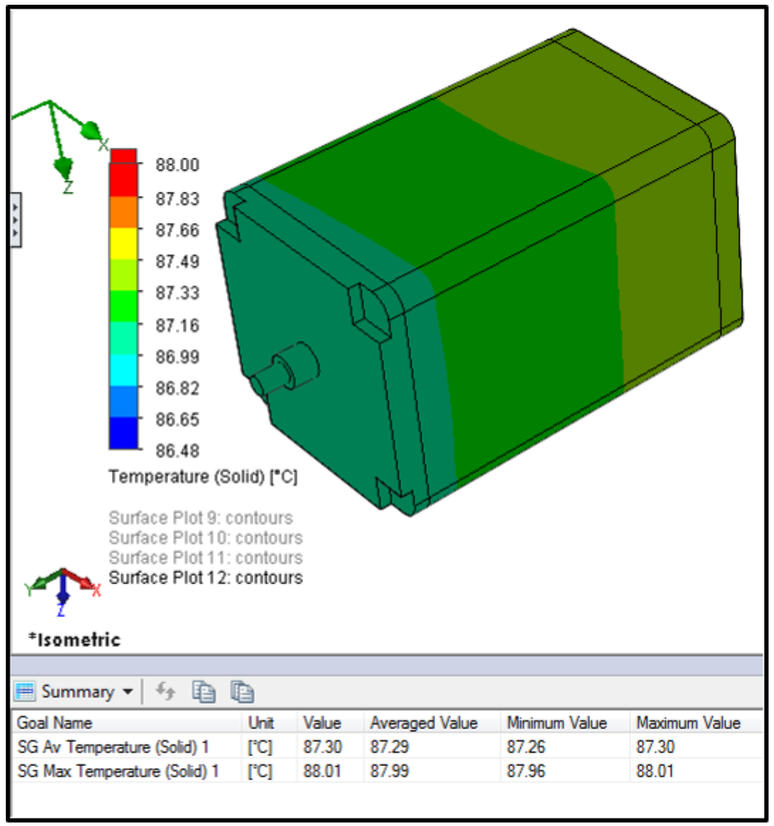


Power Board-Temperature plot



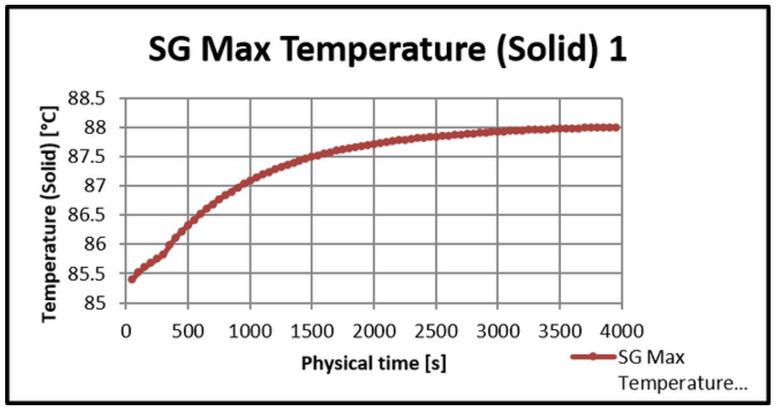
Skin-Temperature

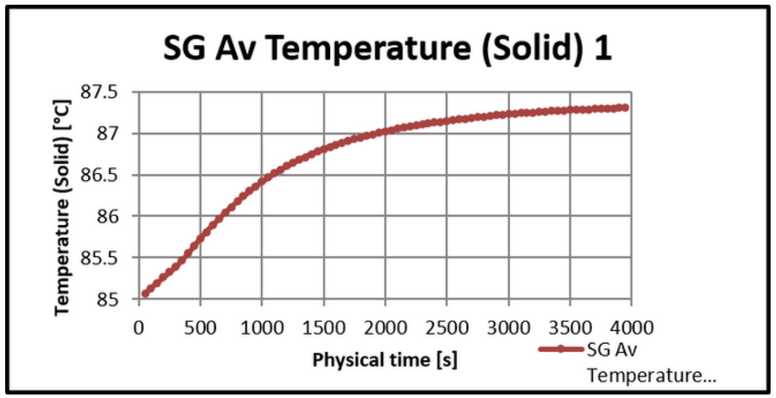
Enclosure Temperature plot



Summary

Goal Name	Unit	Value	Averaged Value	Minimum Value	Maximum Value
SG Av Temperature (Solid) 1	[°C]	87.30	87.29	87.26	87.30
SG Max Temperature (Solid) 1	[°C]	88.01	87.99	87.96	88.01

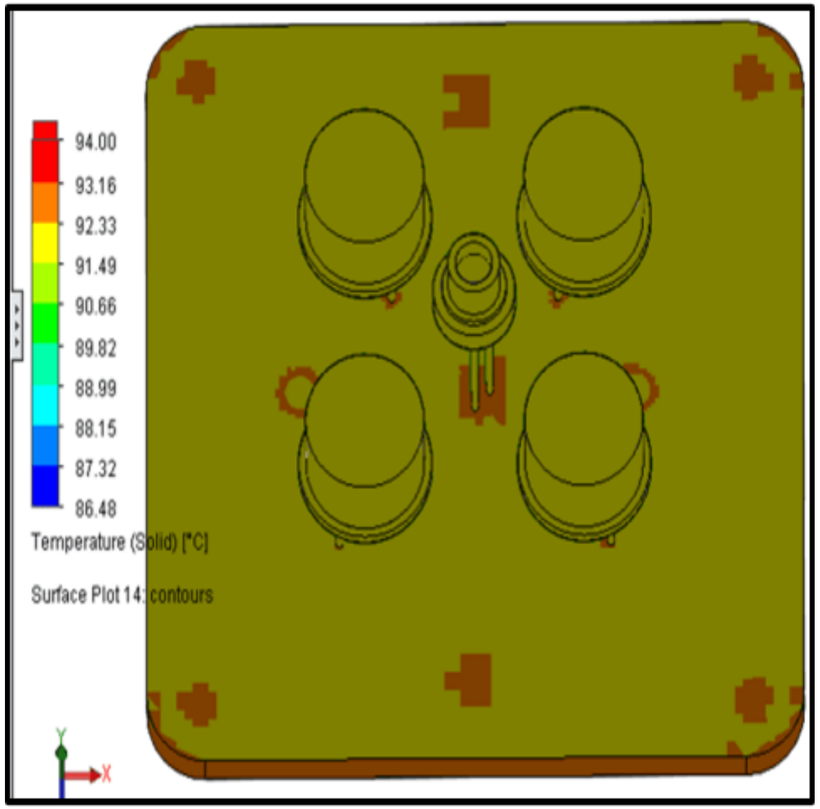


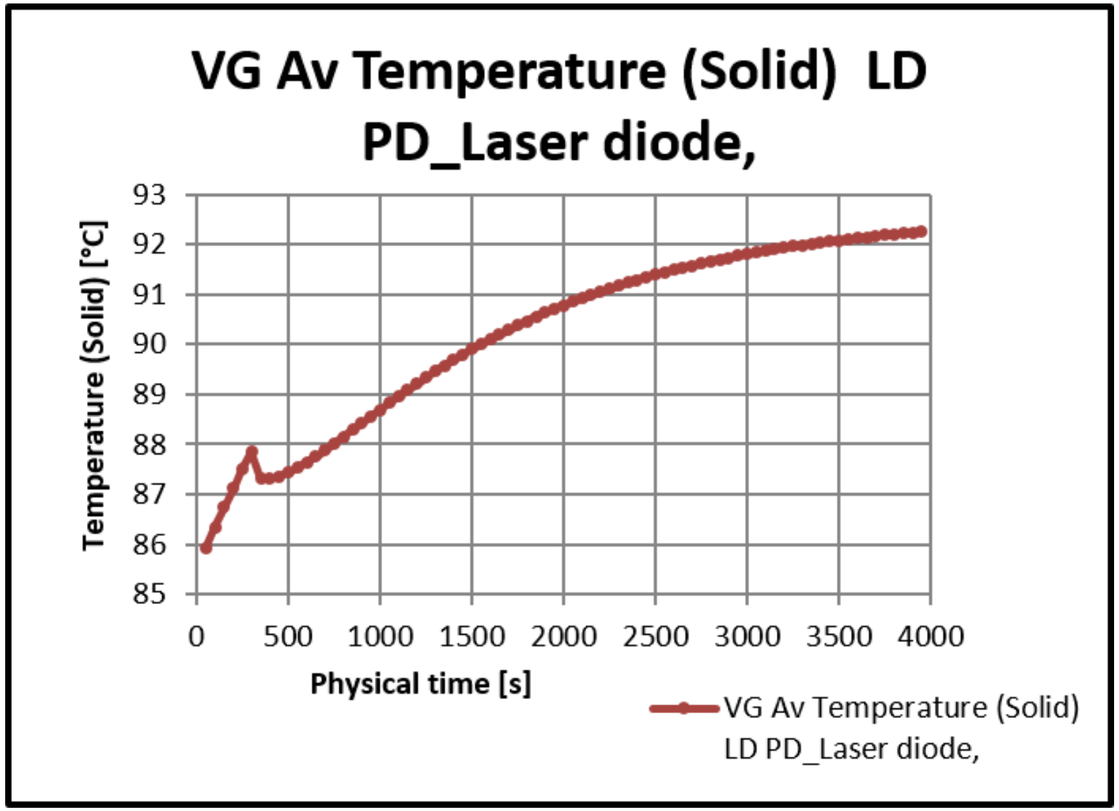


Enclosure temperature reached to 87.29 0c @ ~3950seconds (65 minutes)

LD PD Board Top Chip Level Temperature

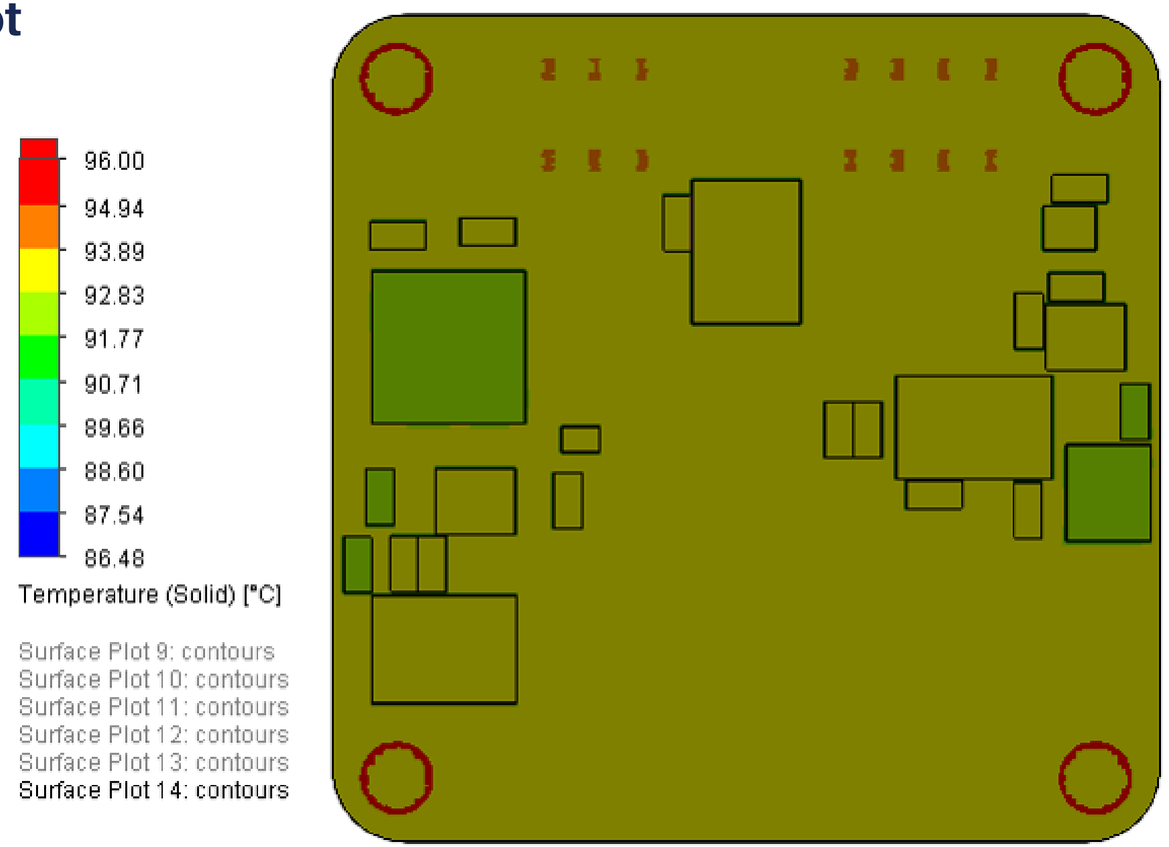
Temperature plot



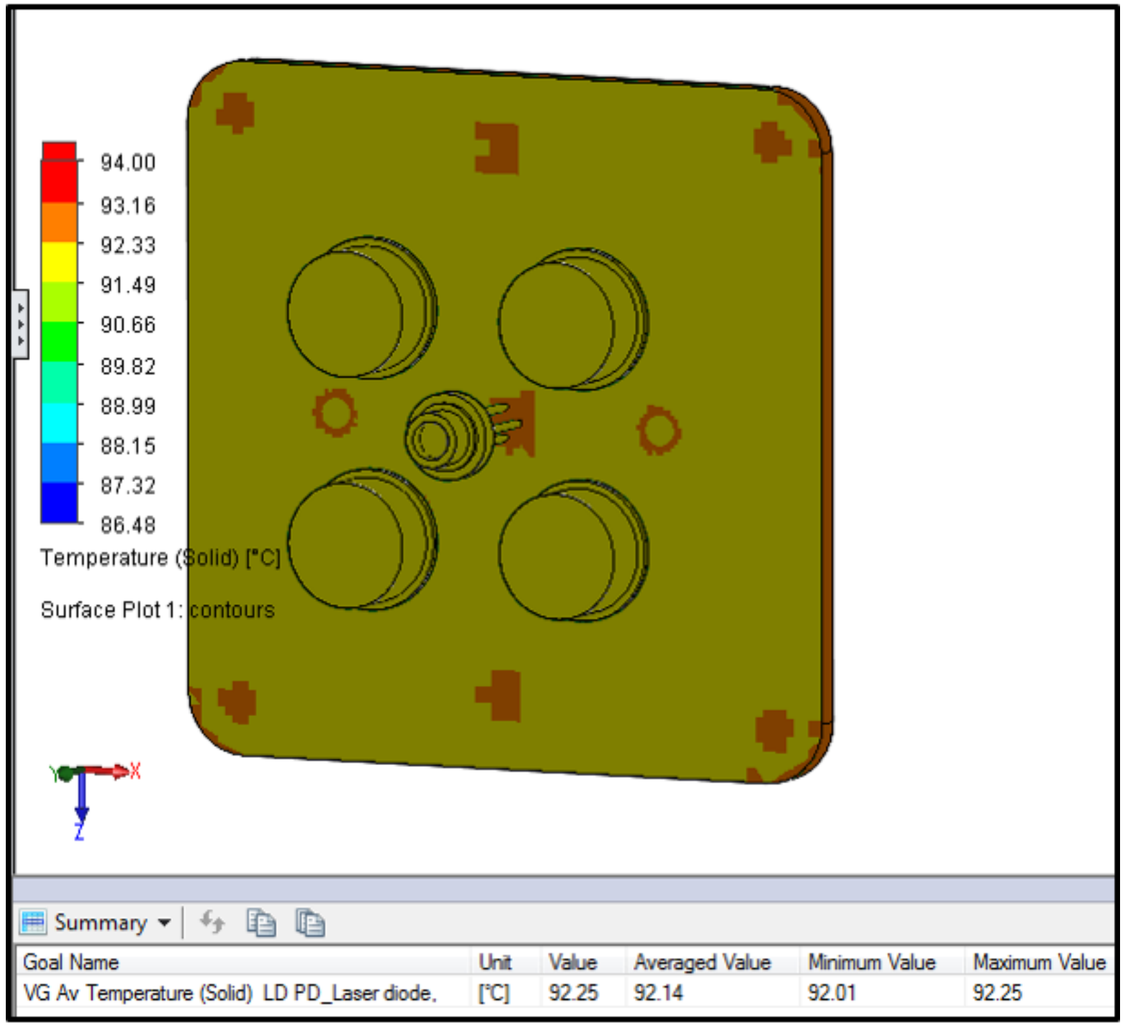


LD PD Board Bottom Chip Level Temperature

Temperature plot

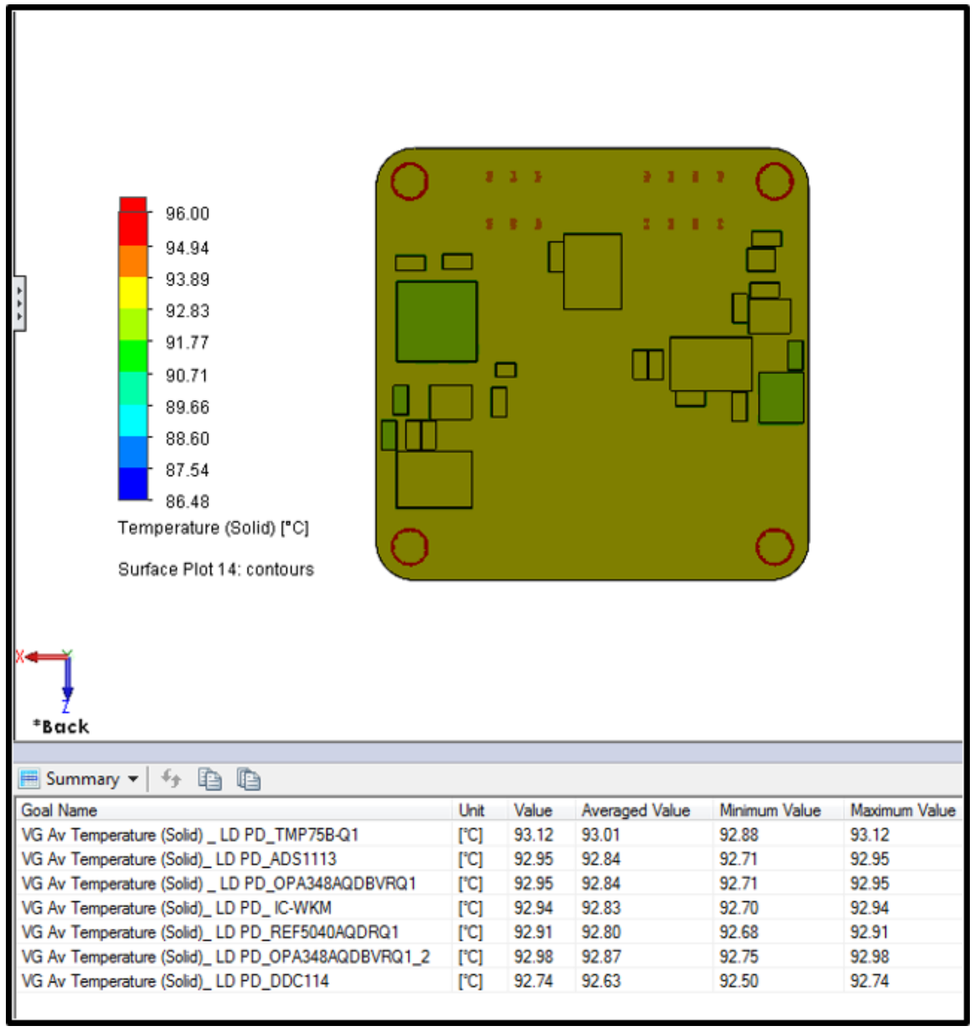


LD PD-Software Output Chip Level Temperature



Summary

Goal Name	Unit	Value	Averaged Value	Minimum Value	Maximum Value
VG Av Temperature (Solid) LD PD_Laser diode.	[°C]	92.25	92.14	92.01	92.25



Summary

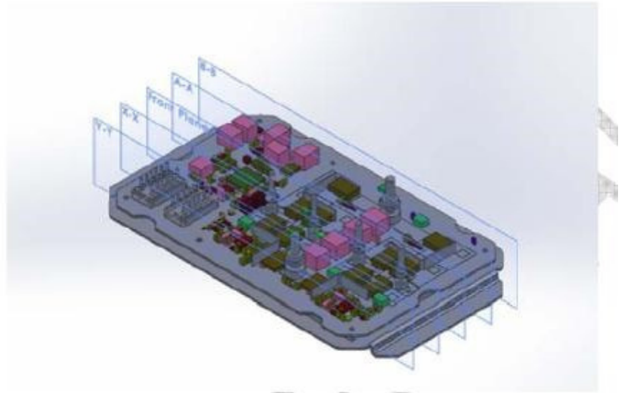
Goal Name	Unit	Value	Averaged Value	Minimum Value	Maximum Value
VG Av Temperature (Solid) _ LD PD_TMP75B-Q1	[°C]	93.12	93.01	92.88	93.12
VG Av Temperature (Solid)_ LD PD_ADS1113	[°C]	92.95	92.84	92.71	92.95
VG Av Temperature (Solid) _ LD PD_OPA348AQDBVRQ1	[°C]	92.95	92.84	92.71	92.95
VG Av Temperature (Solid)_ LD PD_ IC-WKM	[°C]	92.94	92.83	92.70	92.94
VG Av Temperature (Solid)_ LD PD_REF5040AQDRQ1	[°C]	92.91	92.80	92.68	92.91
VG Av Temperature (Solid)_ LD PD_OPA348AQDBVRQ1_2	[°C]	92.98	92.87	92.75	92.98
VG Av Temperature (Solid)_ LD PD_DDC114	[°C]	92.74	92.63	92.50	92.74

6. CFD Thermal- Module Level

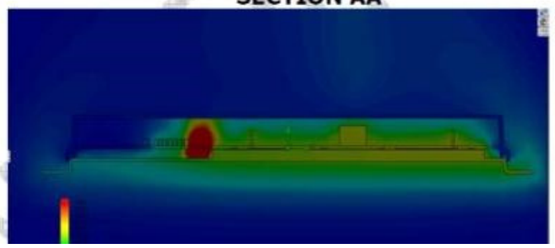
Methodology: Transient analysis – ambient temp. of 25 0C and 80 0C.

Output: Temperature distribution at each section plotted and values tabulated. Heat sink provided validated for sufficiency. Temp 5-7 deg increase.

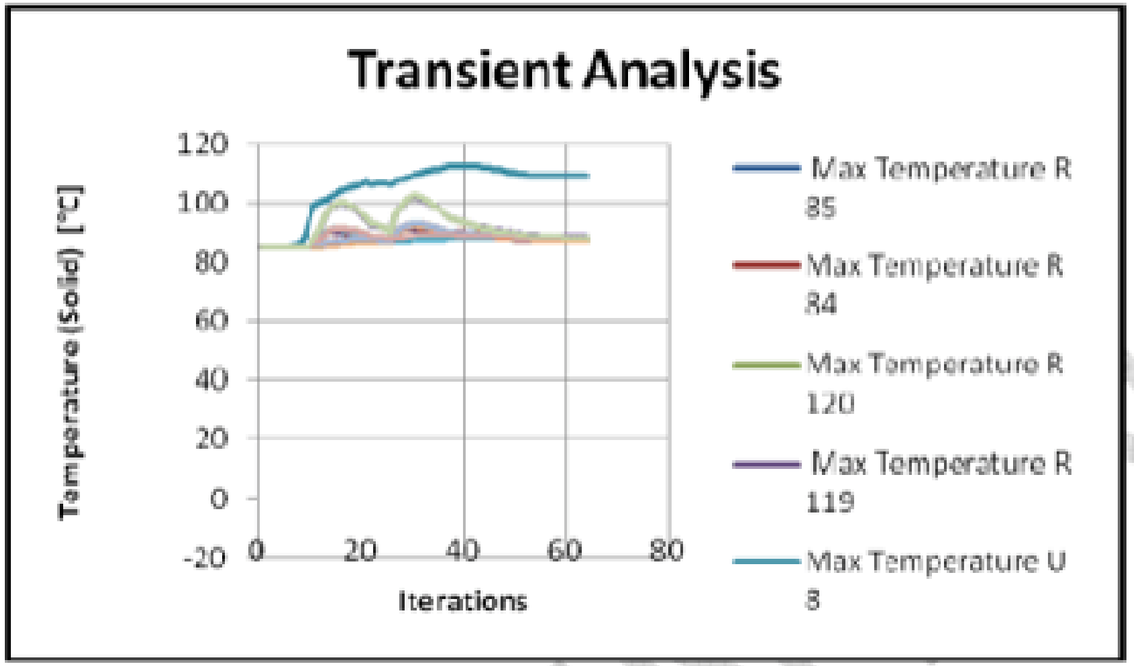
Section Details



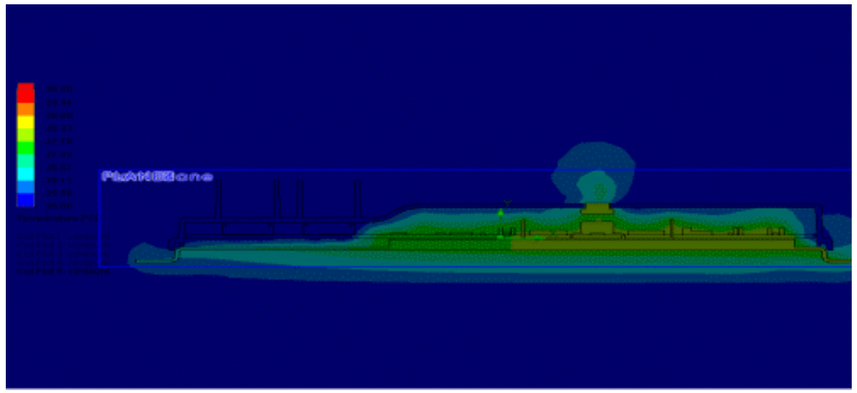
SECTION AA



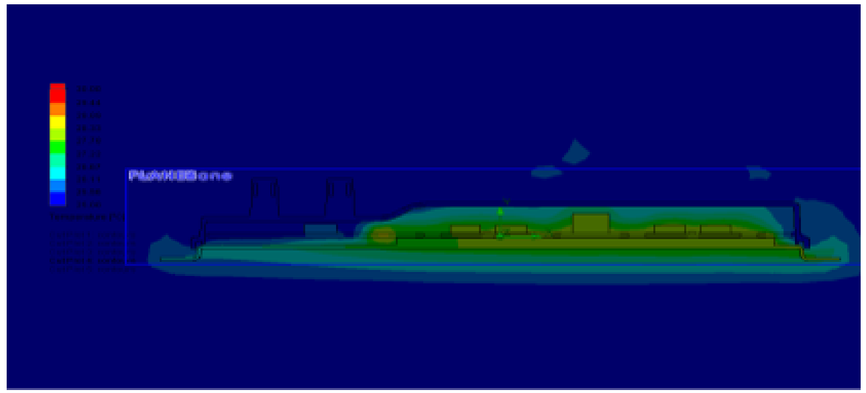
TEMPERATURE Vs TIME



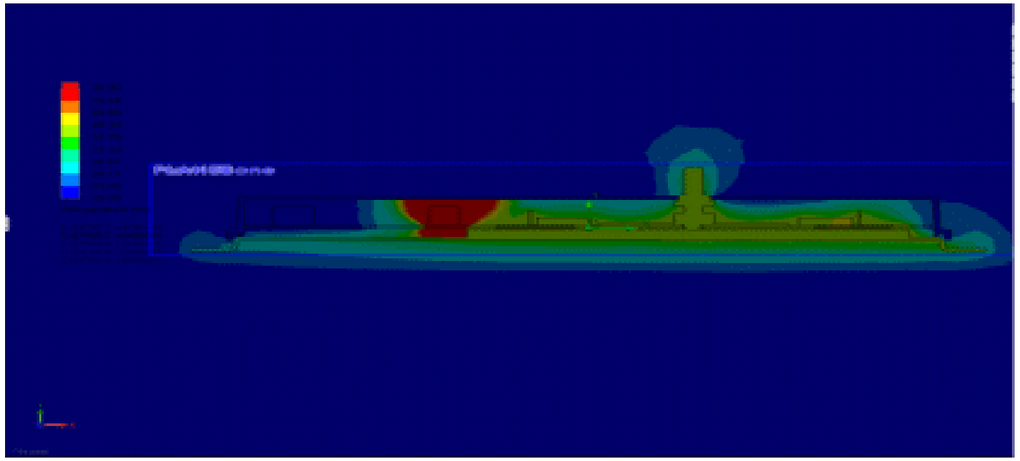
CFD Thermal Module Level



FRONT VIEW PLANE



FRONT VIEW X-X



FRONT VIEW Y-Y

Thermal Load Analysis MODULE

Company Profile:

The on board controls having microprocessors generate heat based on operational requirements. The adequacy of heat dissipation requirements were taken up.

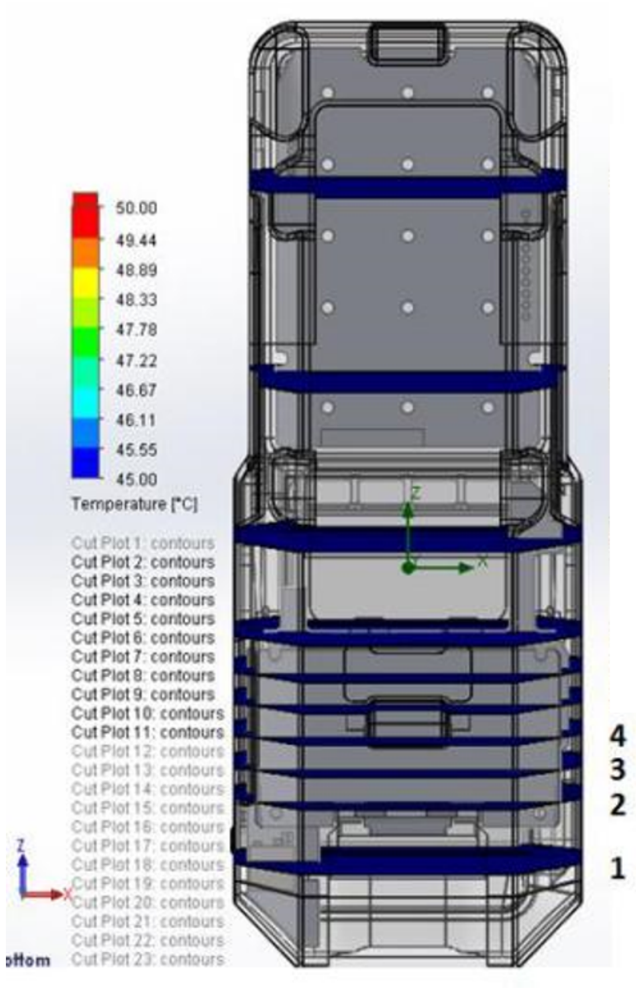
1. Project Objectives -

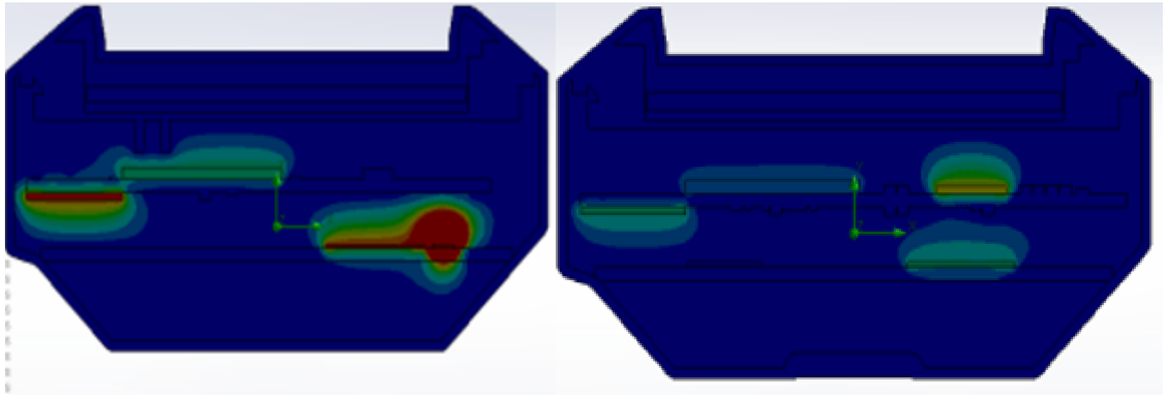
Internal temp distribution to assess efficacy of heat sink for two ambient temp conditions 250 C & 850 C.

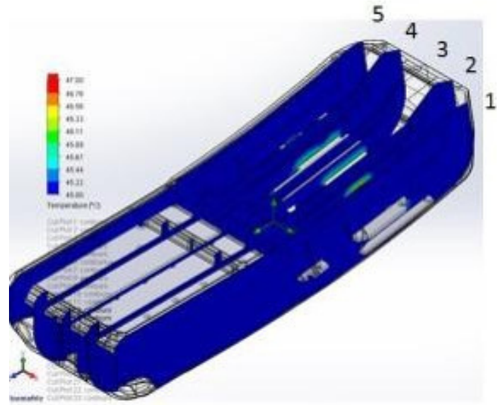
2. Input

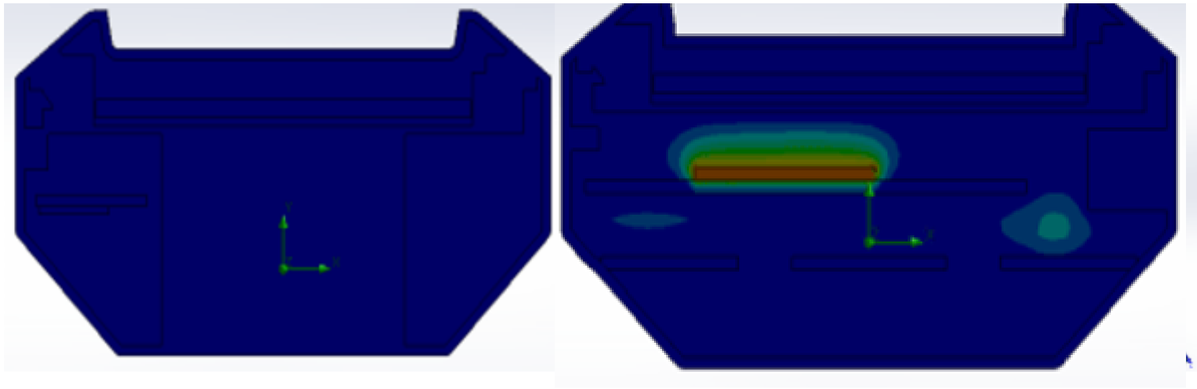
- Heat buildup w.r.t time.
- Enclosure and component drawings.
- Thermal characteristics of components.
- Ambient Temperatures.
- Model

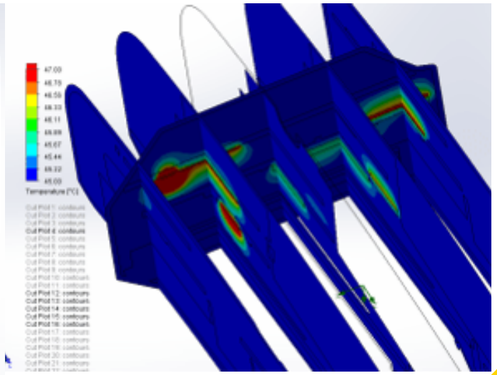
7. Temperature Plots







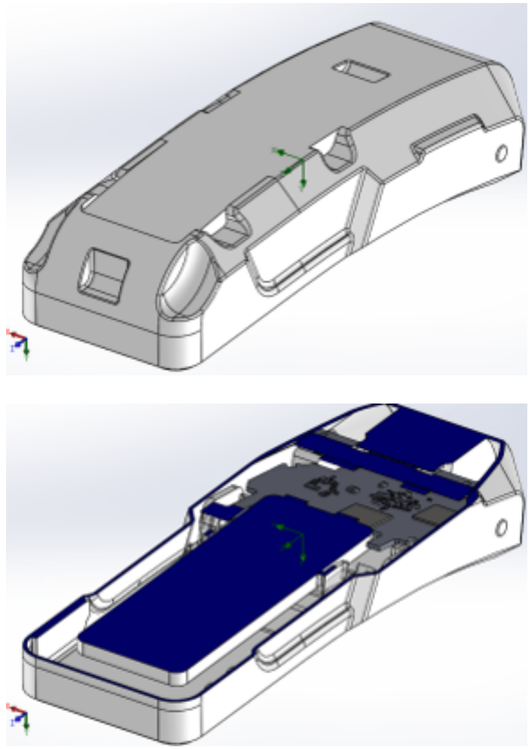


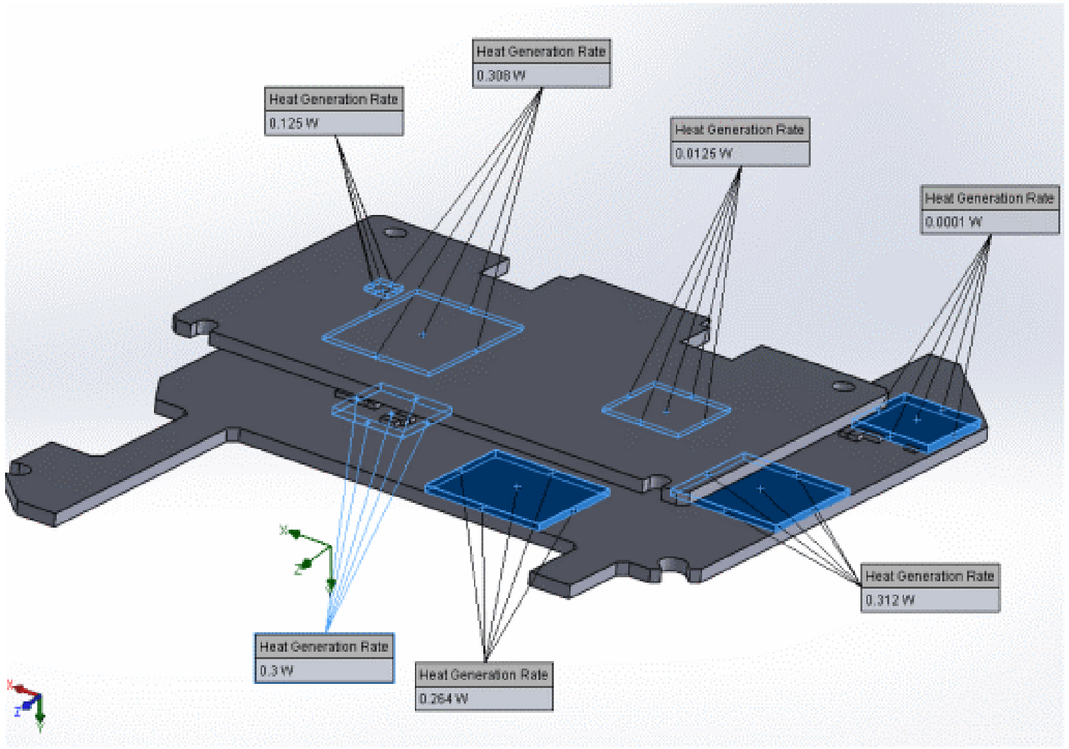


Hand Held Device

AIM: Internal temperature distribution and outer body temperature for ambient temperature condition 450C.

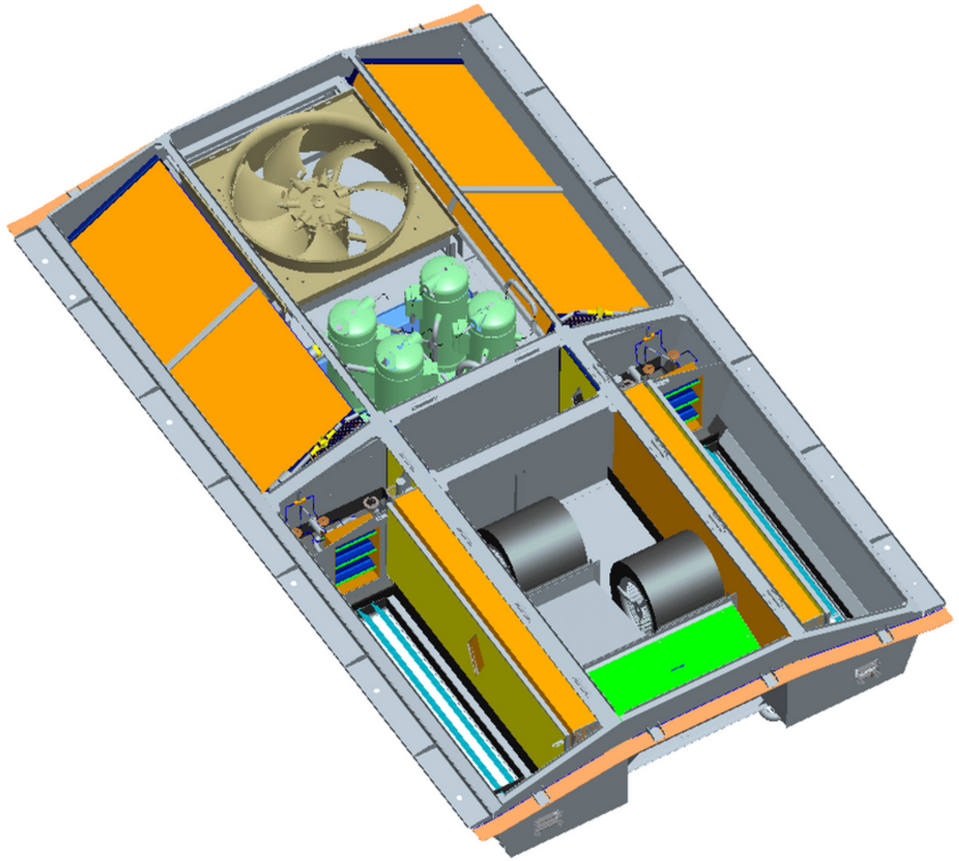
Model Over view & BC



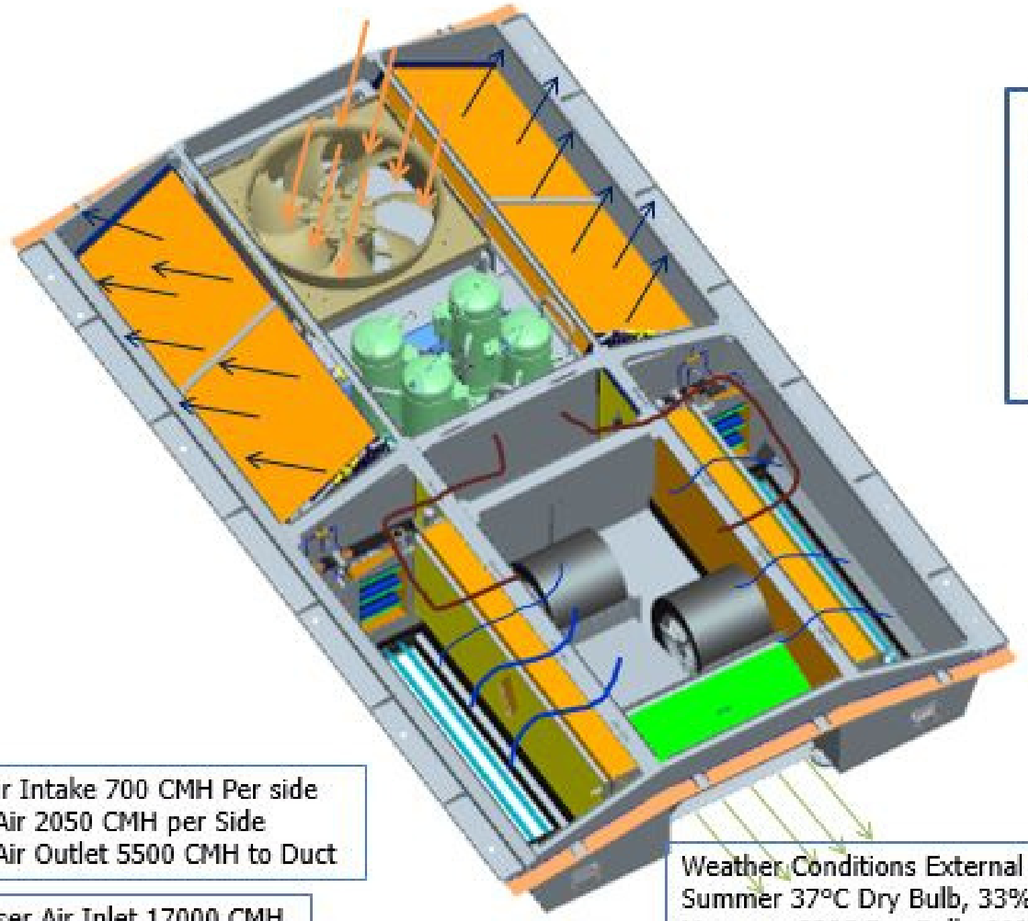


8. Roof Top Mounted Condenser-Rail Car

AIM: To assess the temperatures inside the railway compartment



Input Flow Details



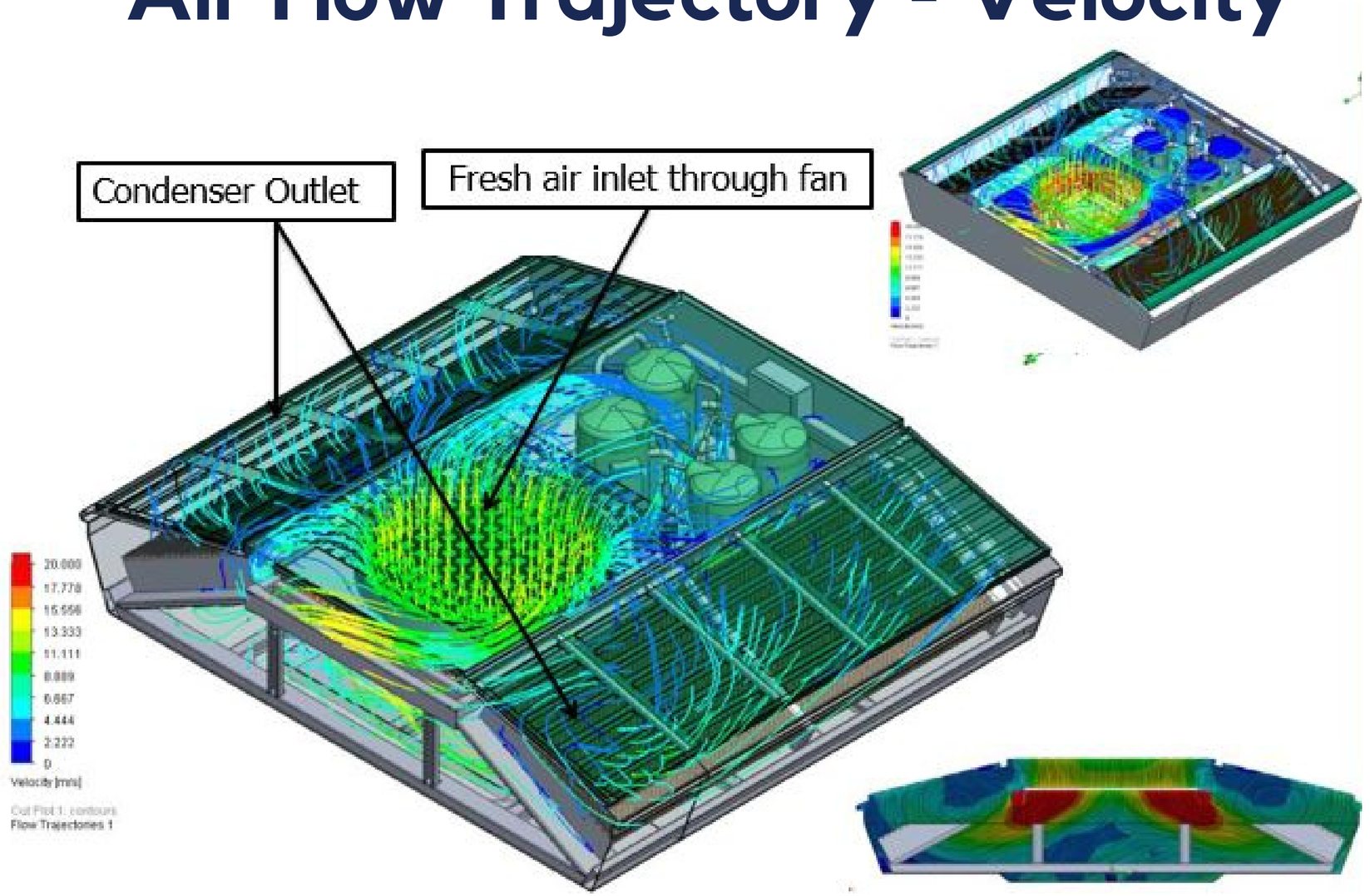
Condenser Air Inlet
Condenser Air Outlet
Fresh Air
Return Air from Coach
Supply Air Fan
5500 CMH

Fresh Air Intake 700 CMH Per side
Return Air 2050 CMH per Side
Supply Air Outlet 5500 CMH to Duct

Condenser Air Inlet 17000 CMH

Weather Conditions External temperatures Internal Conditions
Summer 37°C Dry Bulb, 33% RH 25°C Dry Bulb, 60% RH
Monsoon 32°C Dry Bulb, 90% RH 25°C Dry Bulb, 60% RH

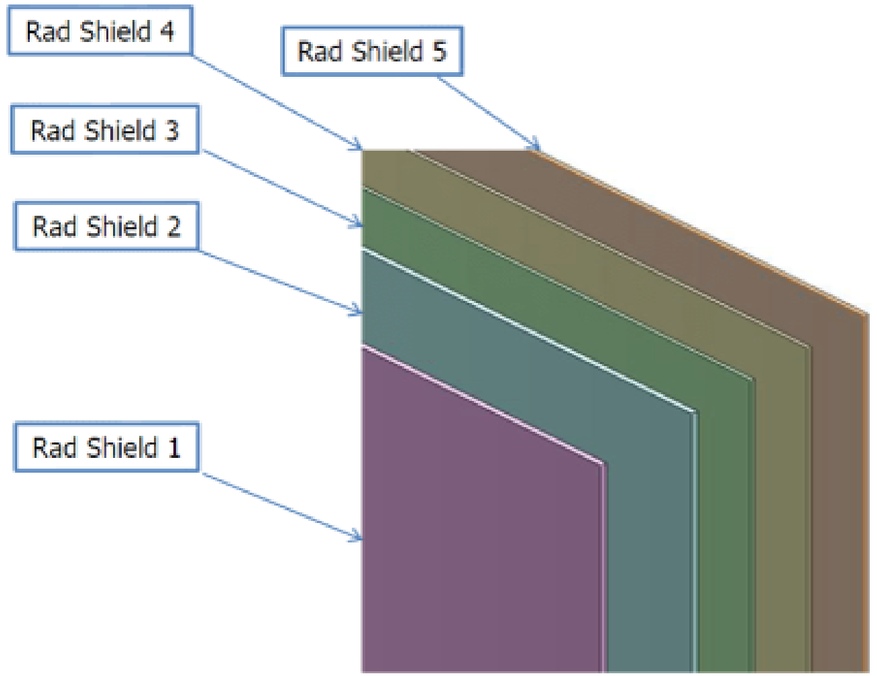
Air Flow Trajectory - Velocity



9. Radiation Shield Industrial Furnace

AIM: To understand the thermal distribution for the heat shields of furnace as per the given shield specification with defined annular distance using CFD based analysis. FEA analysis to be carried out to find the deformation and stability of the radiation shield for the thermal load evaluated from CFD analysis.

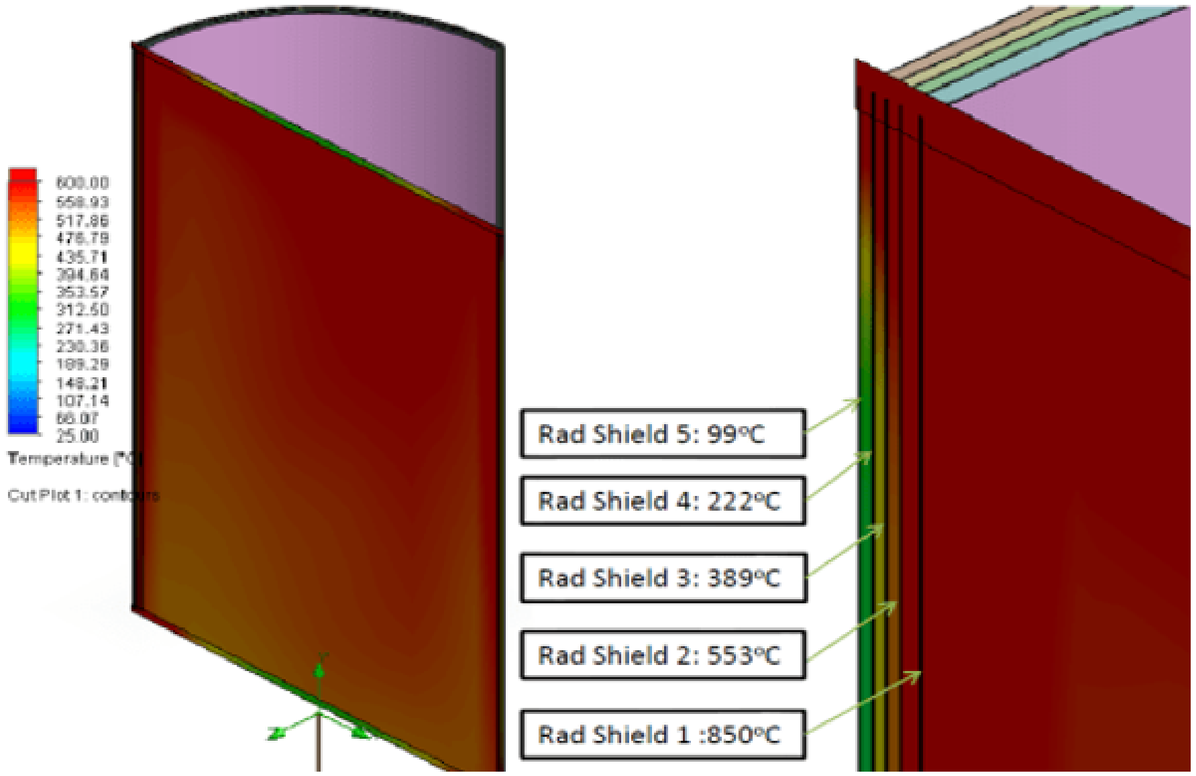
Model Over-View



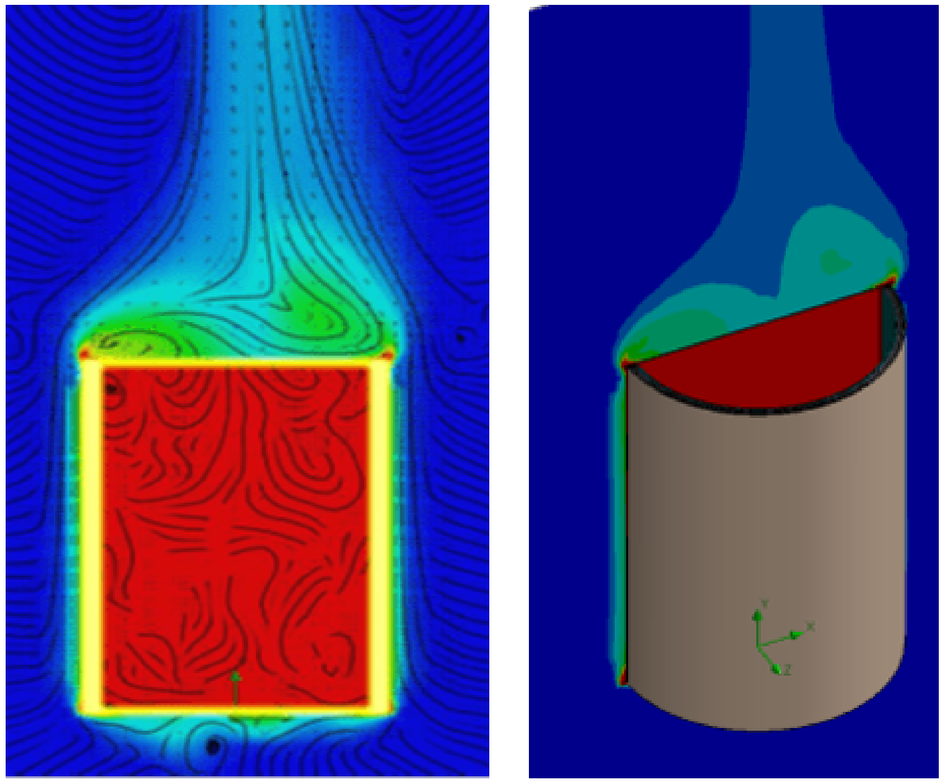
Sl. No	THICKNESS (mm)
Radiation Shield 1	0.5
Radiation Shield 2	0.5
Radiation Shield 3	0.3
Radiation Shield 4	0.3
Radiation Shield 5	0.3
GAP BETWEEN RADIATION SHIELDS	
Radiation Shields 1-2	8 mm
Radiation Shields 2-3	5 mm
Radiation Shields 3-4	5 mm
Radiation Shields 4-5	5 mm

Radiation Shield Industrial Furnace

Temperature distribution through radiation shield



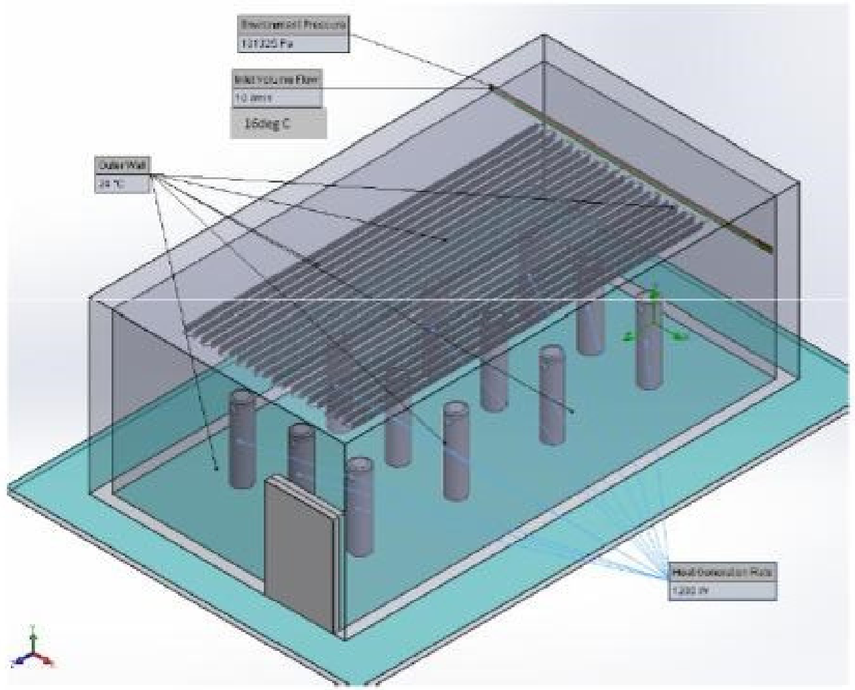
Heat dissipation Plot

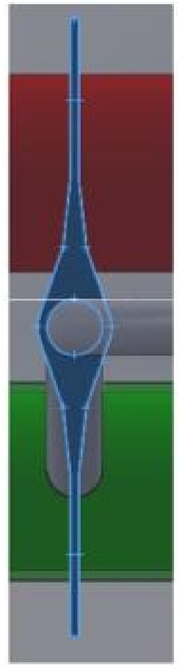


10. Building Level Thermal analysis

Aim: To understand the thermal distribution for the heat shields of furnace as per the given shield specification with defined annular distance using CFD based analysis. FEA analysis to be carried out to find the deformation and stability of the radiation shield for the thermal load evaluated from CFD analysis.

Model Over-View

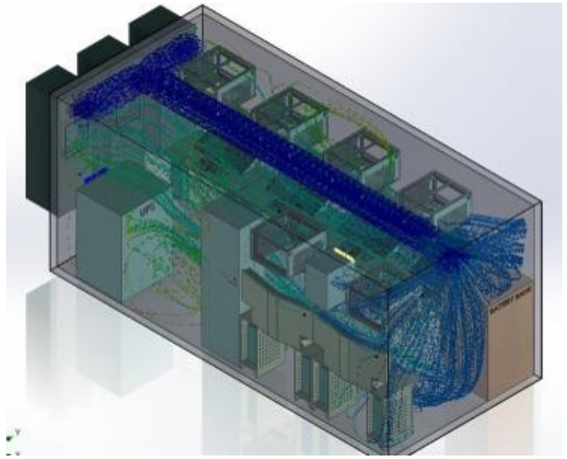


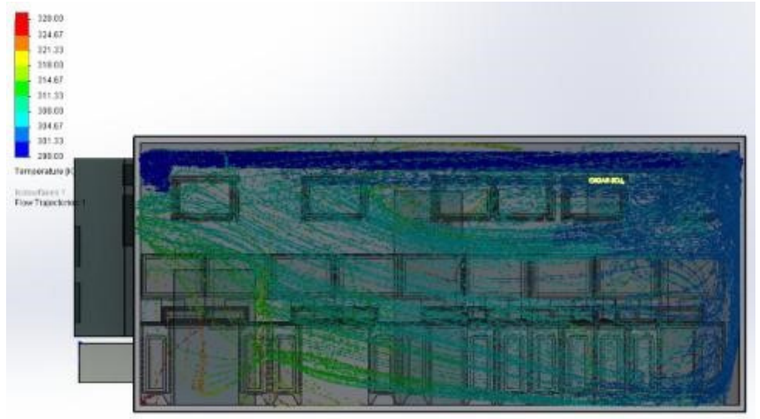


Radiant emissivity of aluminum surface – 0.9

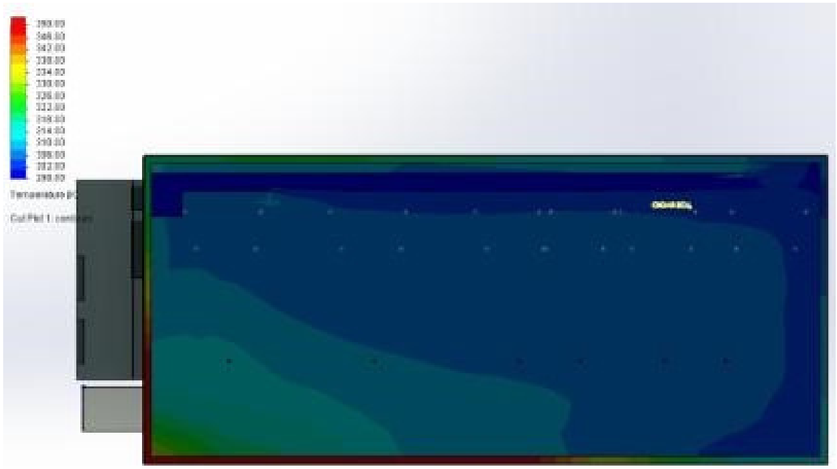
Building Level Thermal Analysis

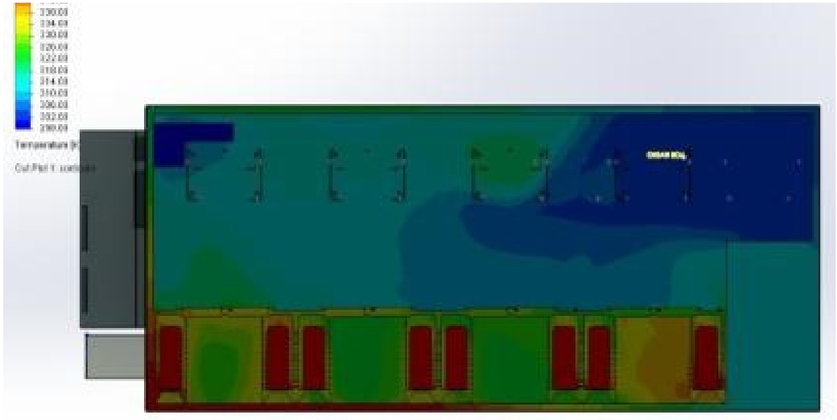
Air Temperature -Flow Path





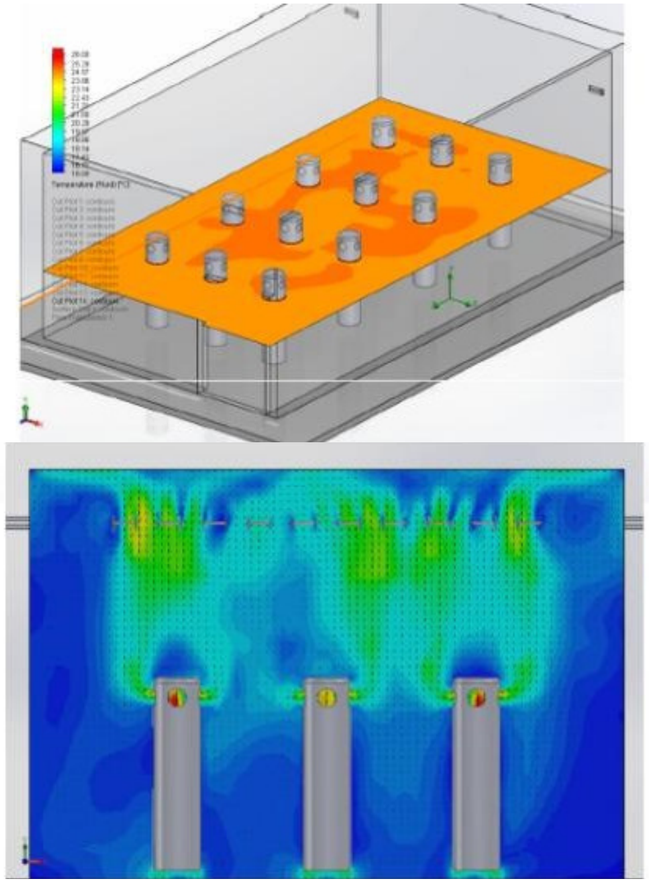
Air Temperature -cut plots



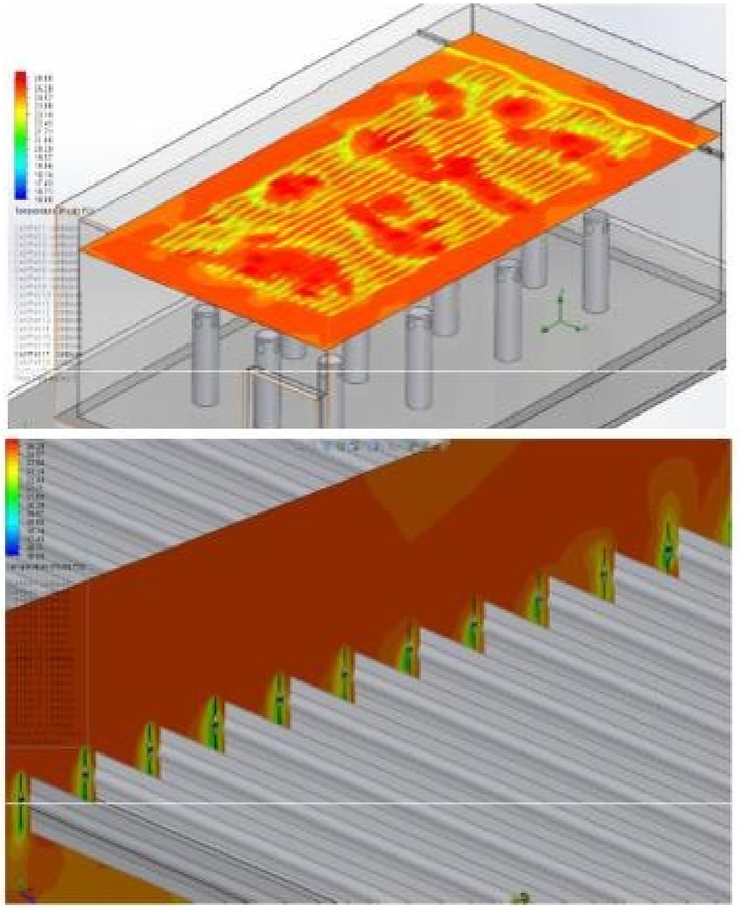


Building Level Thermal Analysis

Air Temperature Distribution



Temperature distribution in Fin Areas

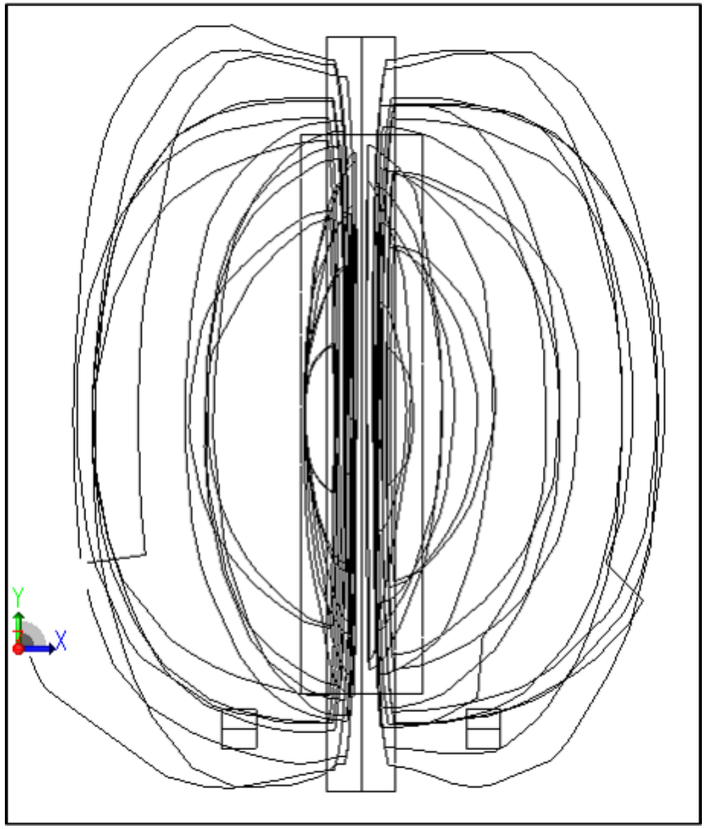


Electro Magnetic Analysis

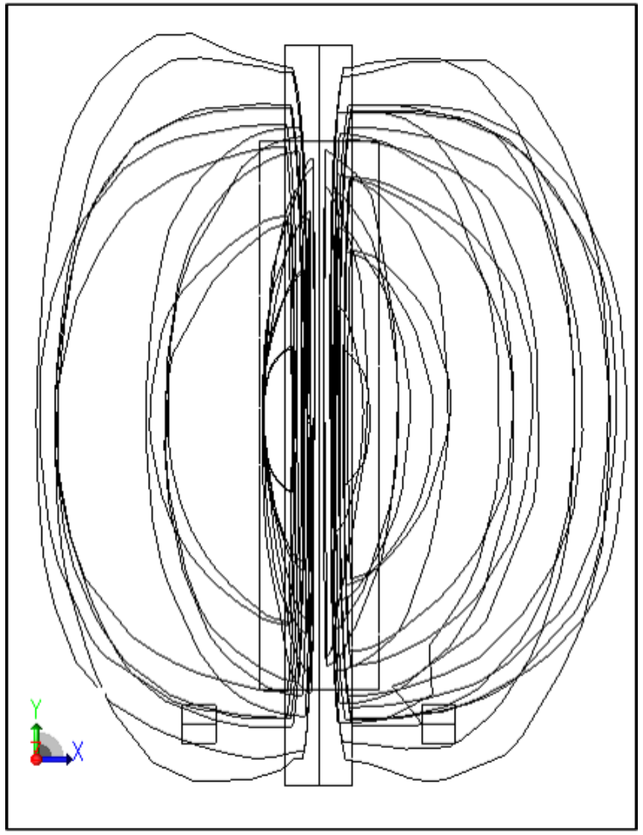
To work out the ship's log response
due to water flow for Navy

Electromagnetic Analysis

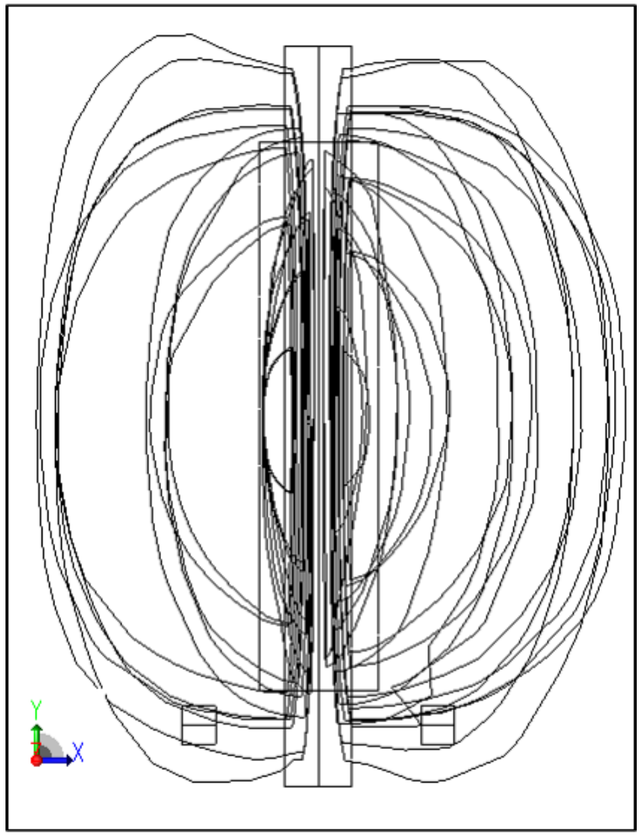
MAGNETIC FLUX PATH PLOT



For speed of 5 m/s



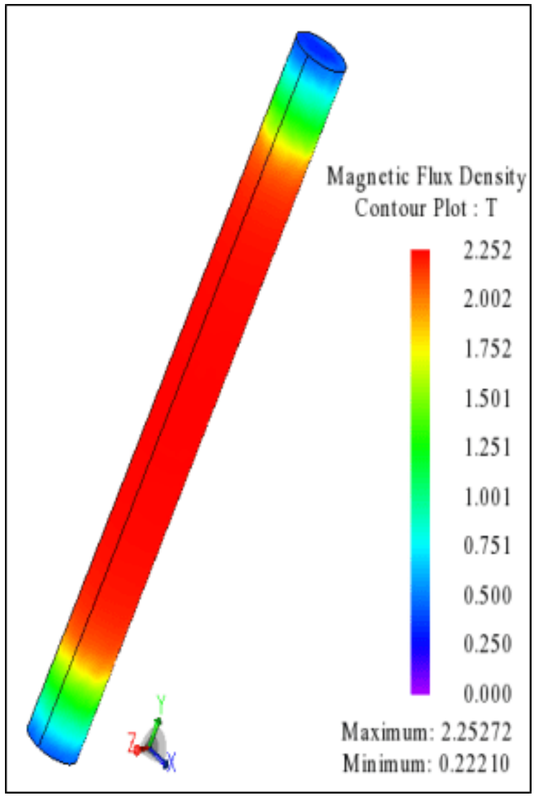
For speed of 10m/s



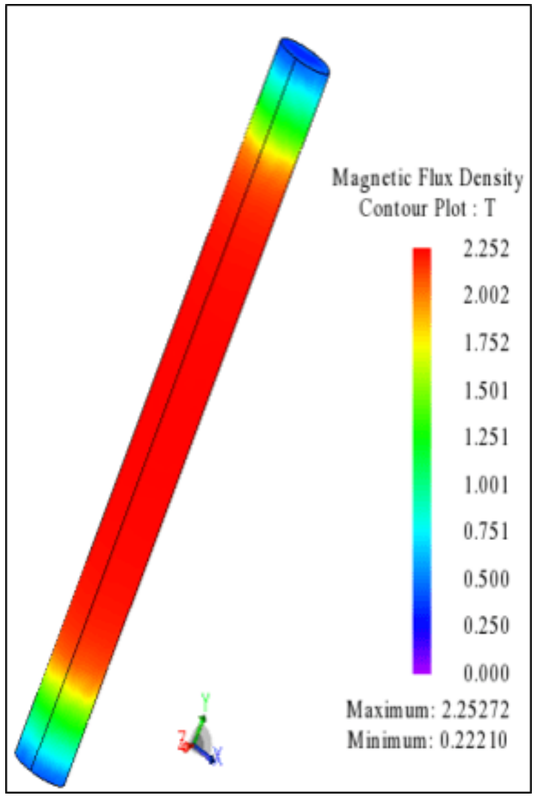
For speed of 15m/s

Electromagnetic Analysis

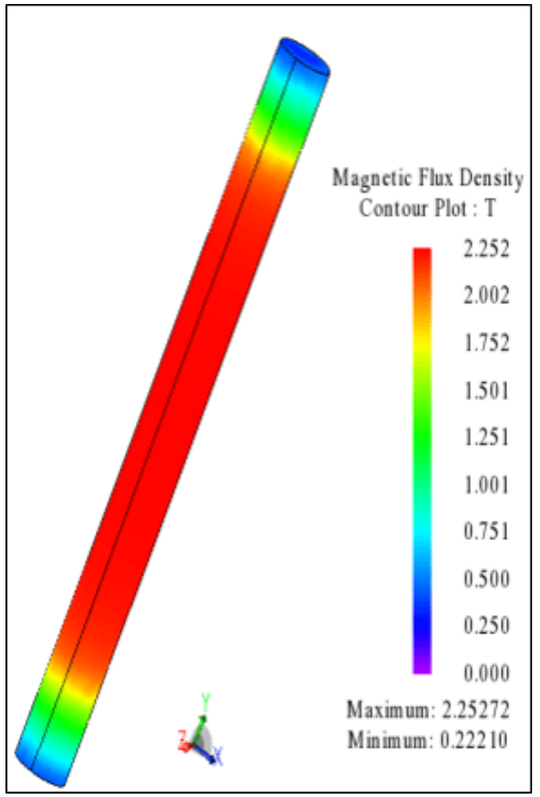
Magnetic flux density distribution on core - 48V & 55Hz



For speed of 5 m/s



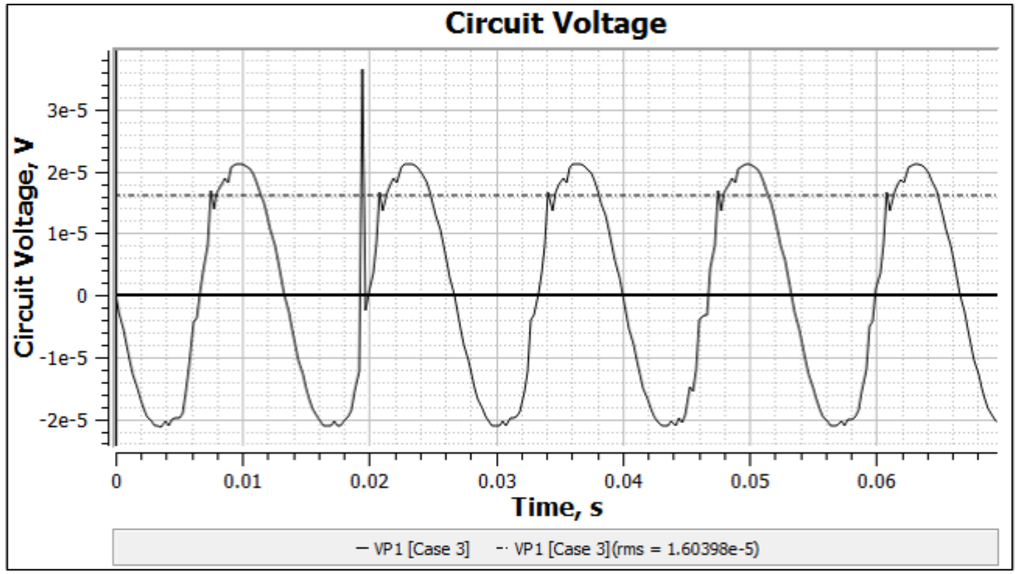
For speed of 10m/s



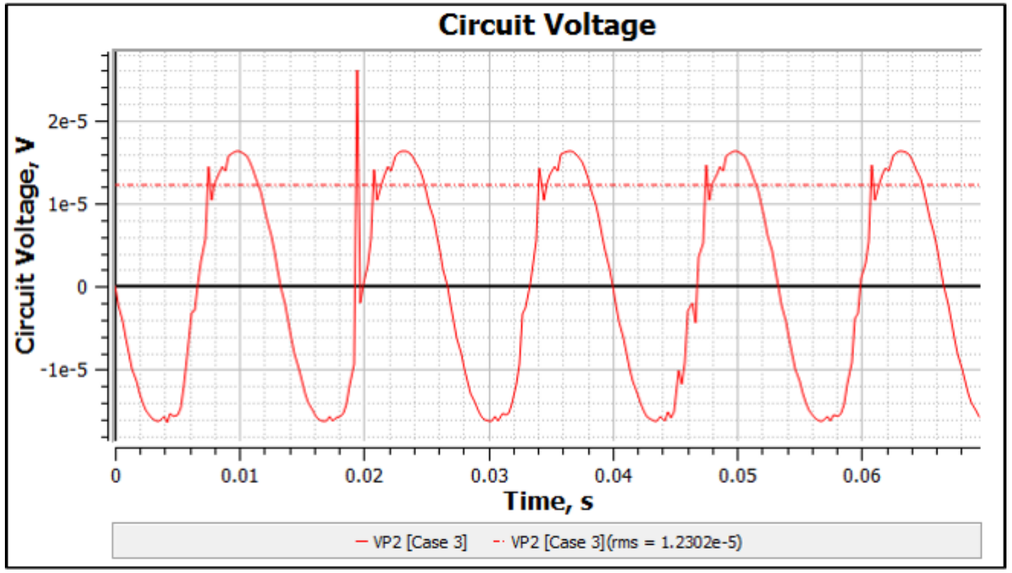
For speed of 15m/s

Electromagnetic Analysis

Induced voltage on electrodes for 15m/s



Induced voltage on electrode-1



Induced voltage on electrode-2

For the given input voltage of 60V and frequency of 75Hz with the speed of 15m/s, the induced rms voltage at electrode-1 is0.0160mV and at electrode-2 is 0.0123mV

Shock & Vibration Analysis Defense Projects

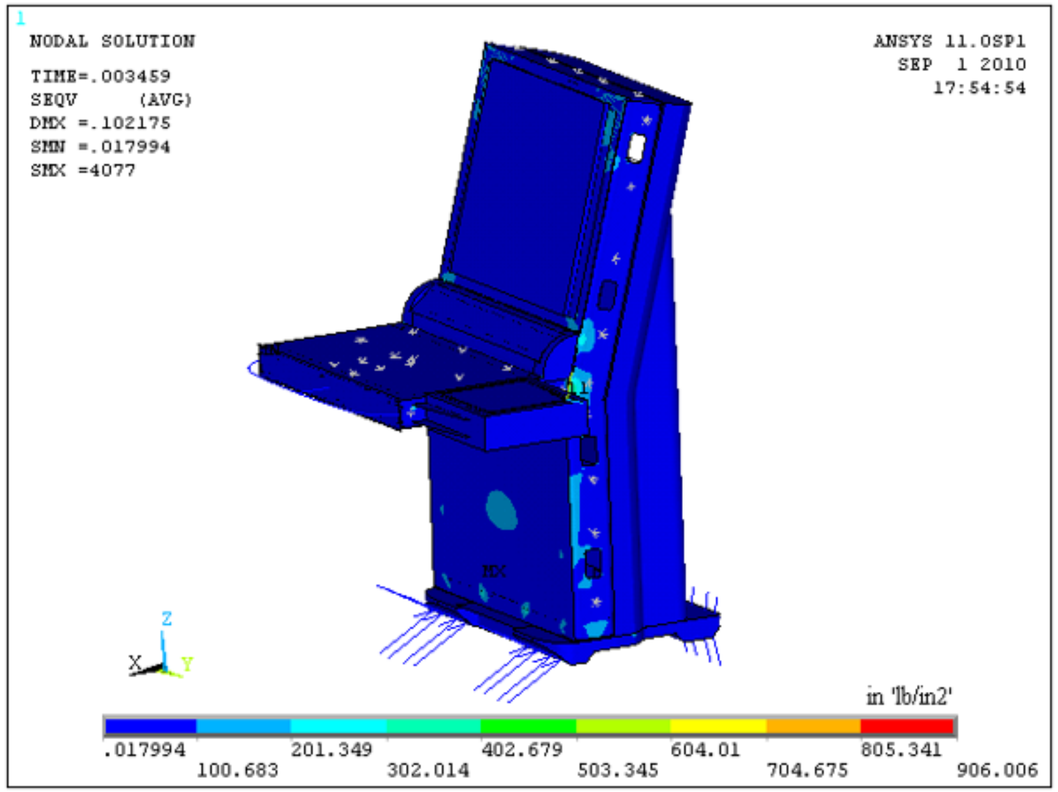
Shock & Vibration Analysis

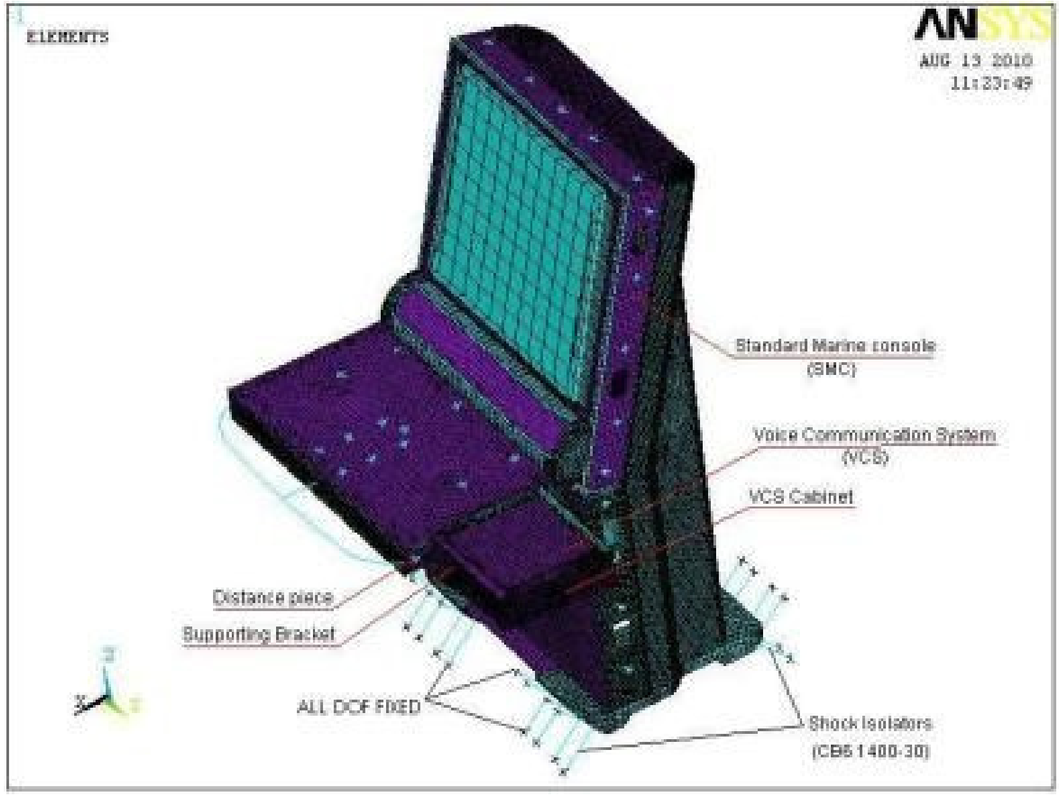
CASE STUDIES (Defense order contact person details appended)

1. Ship Operating consoles.
2. Shock Analysis of Power amplifier cabinet.
3. Marine Valve shock analysis.
4. Modal Analysis of Armature of a cooling fan.
5. S band communication tube road ability & Vib analysis,
6. Drop analysis.

1. Shock Analysis of Electronic Console

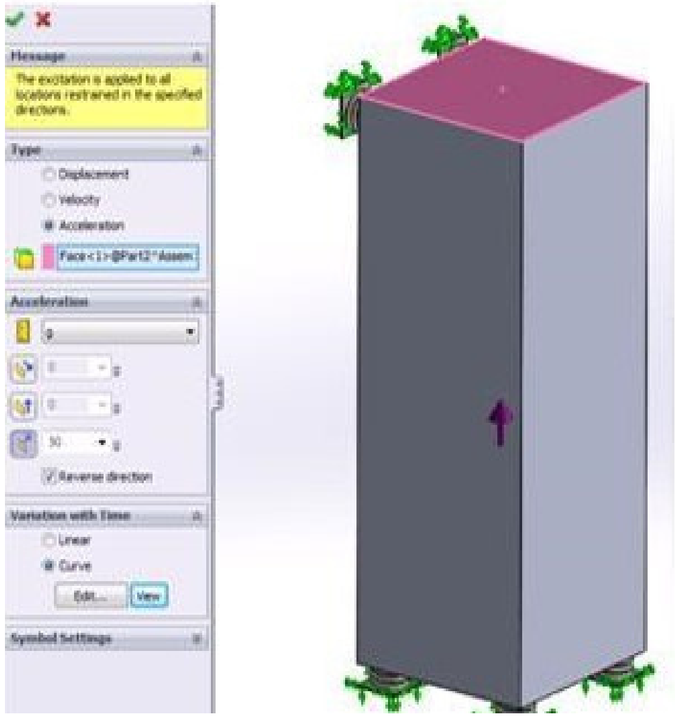
Another firm engaged Conceptia to carry out the design of support for a display unit capable of withstanding the shock loading at sea. The project involves modal analysis and thereafter simulated testing to a very high shock load of 150 g

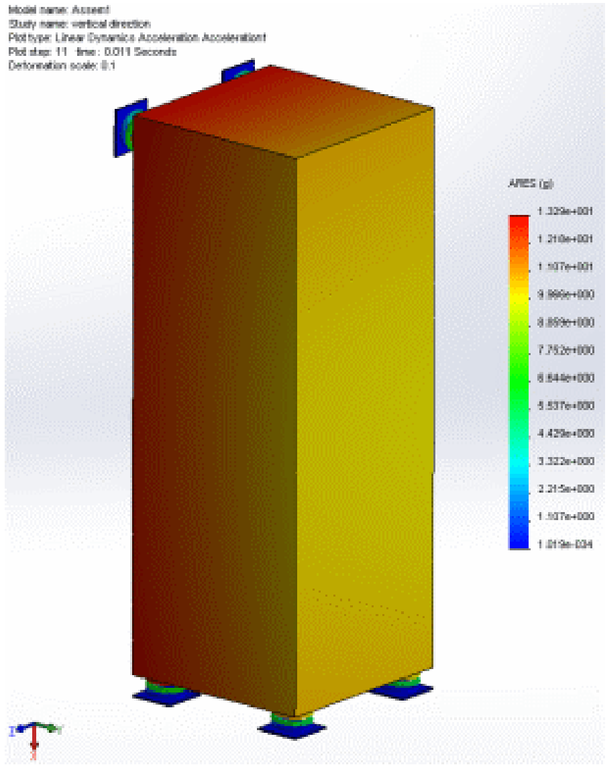


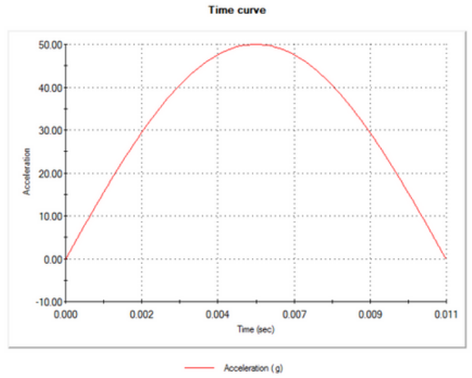


2. Shock Analysis of Electrical Cabinet

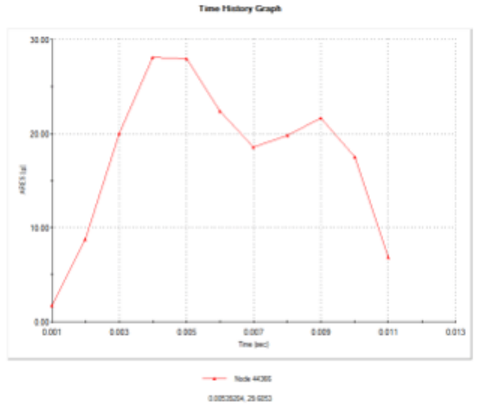
AIM: To asses the structural integrity of cabinet under a Shock Load 50 g
Covenant Standards: JSS55555 & BR3021







Input Load curve



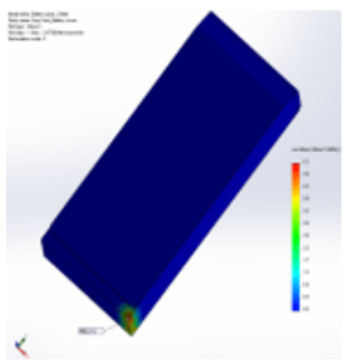
Post Attenuation Loading (27g)

Drop Test Battery Cover

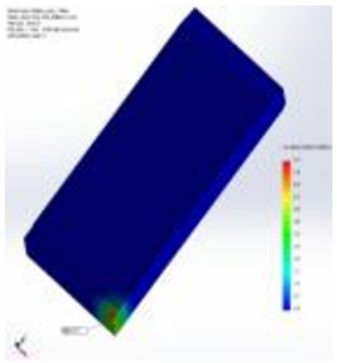
AIM: To find the structural integrity of Battery pack assembly under impact due to fall / drop from 0.75m of height.

Output: Independently analyzed stress due to impact load on all six faces plus corner .Identified corner impact has highest stress generated. Small change in Battery holding arrangement within pack improved ability to withstand shock.

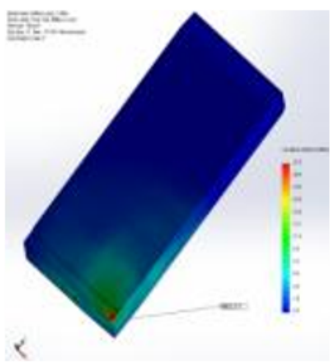
Standard :BR 3021 & IS13035



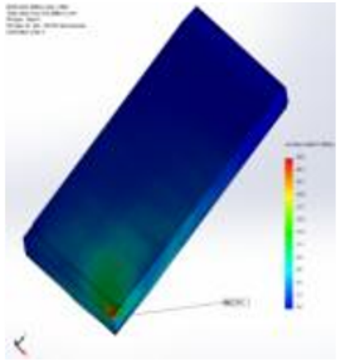
Plot step - 1



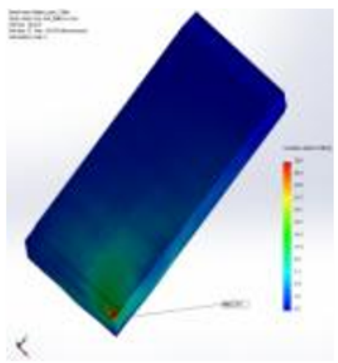
Plot step - 2



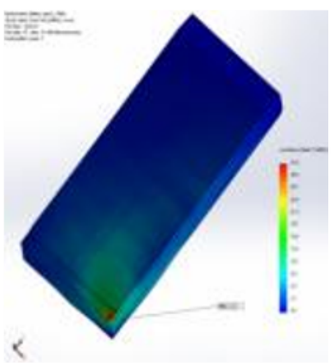
Plot step - 5



Plot step - 10



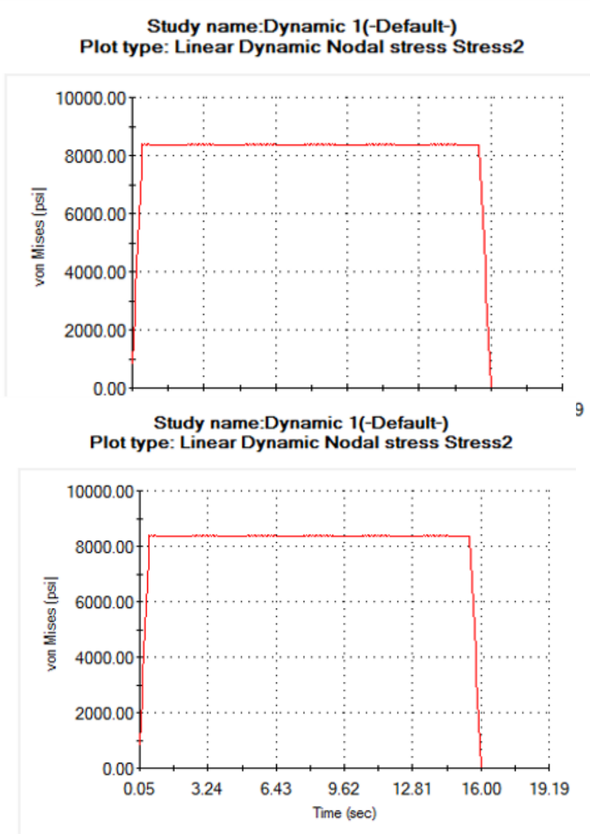
Plot step - 15

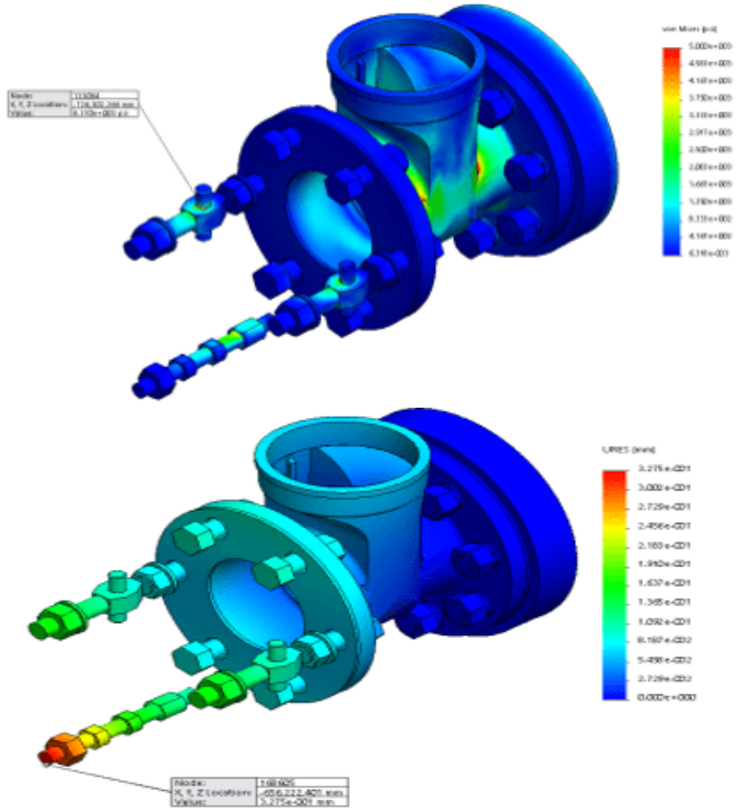


Plot step - 25

3. Shock Analysis of Valve

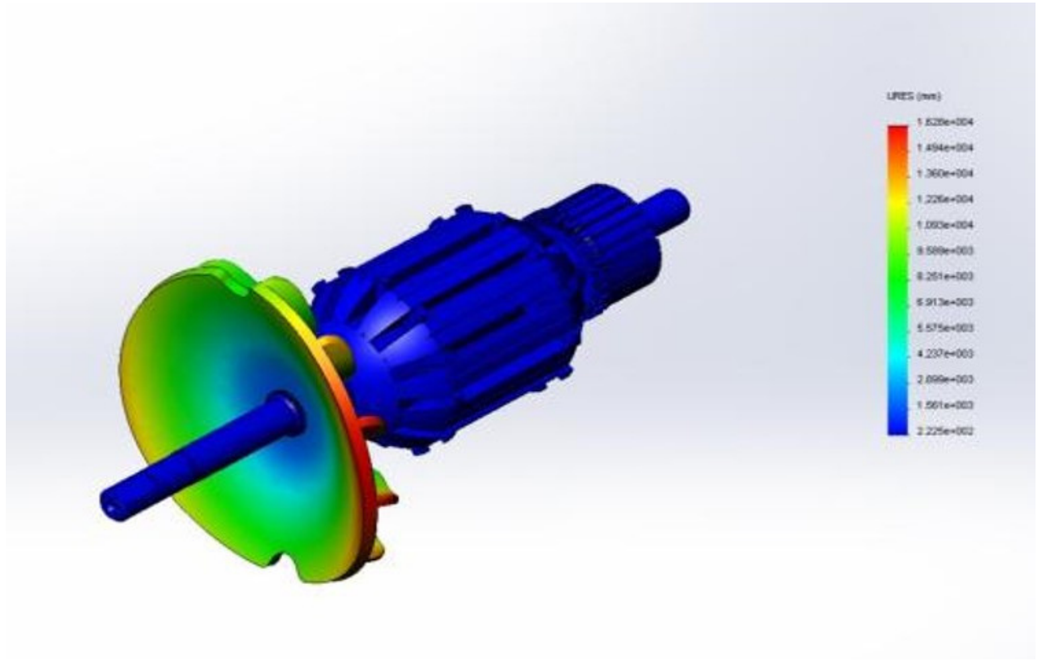
AIM: To understand shock withstanding capability of sea valve.
Pressure shock test condition :300 psi (21.09 kgf/cm2) hydraulic pressure for 15 seconds.



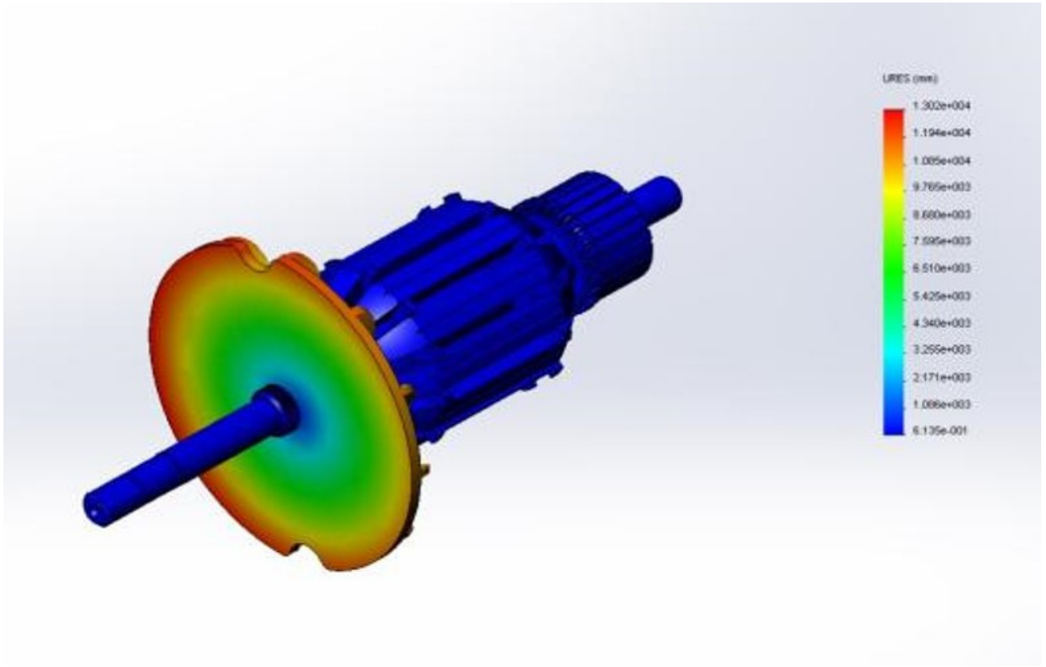


3. Shock Analysis of Valve

AIM: To carry out Modal analysis to arrive at simulated loads on ABS fan body due to vibrations caused by high speed motor.



Mode Shape :3

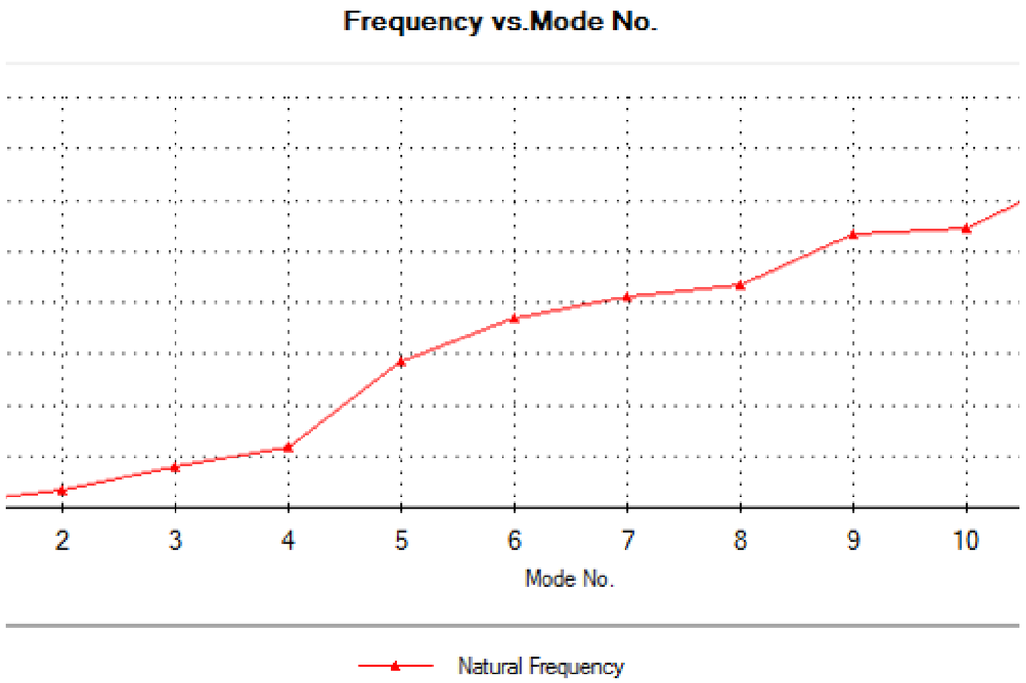


Mode Shape :5

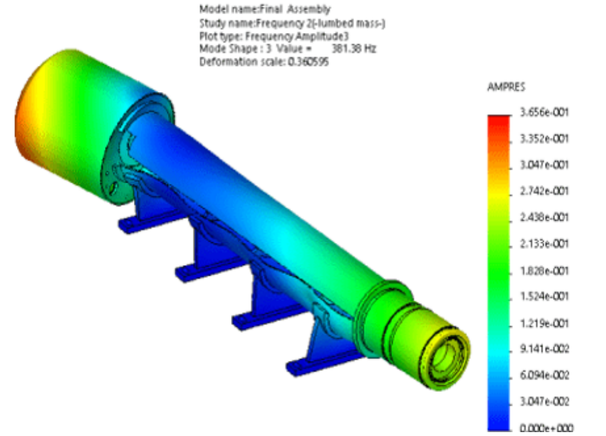
Modal Displacements with no load condition.

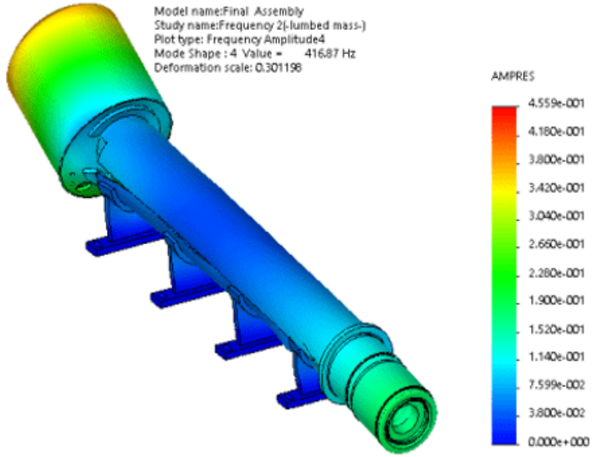
5. Modal Analysis of Long Body

AIM: To perform the frequency analysis and extract the mode shapes and frequency values for a long body to assess the various induced vibrations during road transportation.



Graph - Frequency Vs Mode No





Ruggedized Design & Manufacturing For Military Application

Integrated Manufacturing

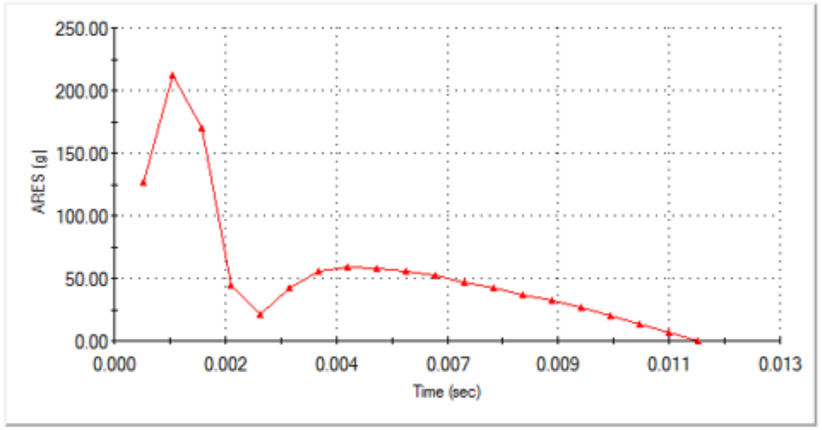
CASE STUDIES (Defense order contact person details appended)

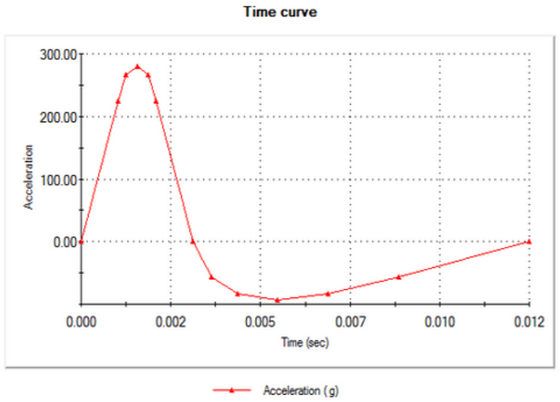
1.Control system cabinet-Design and Manufacture –

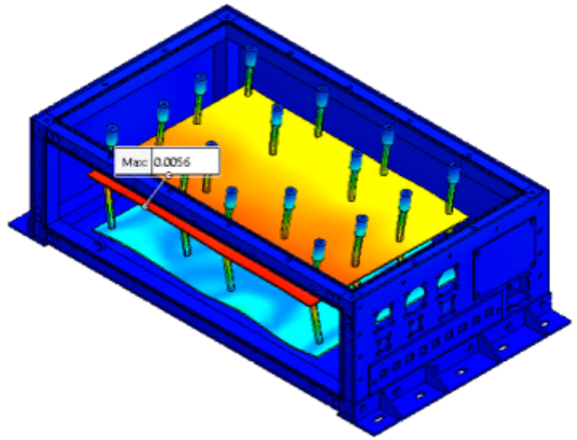
2.Ruggedized electronic enclosures

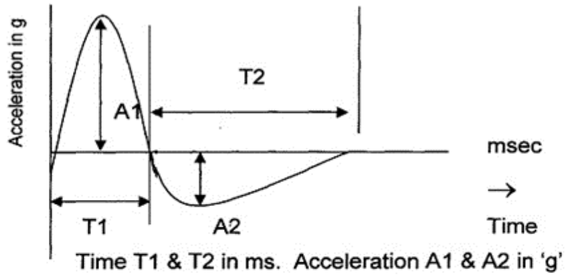
1. Shock Analysis of Electronic Enclosure

Ruggedized design and fabrication of Electronic Enclosure for military application. Design has been validated through FEA and physical shock testing. Max shock 300g for 3 mili seconds









Weight in Kgs	Vertical				Longitudinal				Horizontal			
	A1 (g)	T1 (ms)	A2 (g)	T2 (ms)	A1 (g)	T1 (ms)	A2 (g)	T2 (ms)	A1 (g)	T1 (ms)	A2 (g)	T2 (ms)
0-60	180	3	83.5	6.5	220	2.5	59.5	9	280	3	94	9.0

Physical Shock Test - Certificate

wipro

TARANG
PRODUCT QUALIFICATION & COMPLIANCE PLANET

1 TEST REPORT SUMMARY

Applicant	Conceptia Software Technologies Pvt. Ltd.
Manufacturer	Conceptia Software Technologies Pvt. Ltd.
Product Name	Electronic Enclosure with Controller Board and Interface Board (Raksha Niyantrak Upakaran)
Product Model	ED69239DCTRA
Serial No	Electronic Enclosure - 18033139-0002 Controller Board – AS04180173 Interface Board - 180822014A
Date of receipt of test item	21/09/2018
Date of Test	21/09/2018
Venue of Test	Tarang Lab

Applicable Standard	Description	Criteria / Class
Customer specification	Mechanical Shock test	Operational

Electronic Enclosure with Controller Board and Interface Board was tested by Tarang Lab as per customer specification. Based on the observations during the test and interpretations by Tarang lab, results have been indicated. The test results produced in this report shall apply only to the above sample that has been tested under the specific conditions and modes of testing as described in the report. Other similar equipment may not necessarily reproduce same result due to production tolerances and measurement uncertainties. Any measurement uncertainties listed in this report are for information purpose only.

The results shall stand invalid, in case there are any modifications / additions / removals to the hardware or software or end use atmosphere to the product tested. This report shall not be modified or in any way revised unless it is expressly permitted and endorsed by Tarang lab, through a duly authorized representative. Particulars on Manufacturer / Supplier / Product configuration / performance criteria, given in this report, are based on the information given by the customer, along with test request. Tarang does not assume any responsibility for the correctness of such information for the above-mentioned equipment under test.

Customer acknowledges that this is a test report and not a certificate to gain market access for the product. To gain market access, Customer needs appropriate clearance from the Government or authorized agency for the target market. For markets that allow self-declaration, customer needs to follow the procedure defined by the target market.

Prepared by	Reviewed by	Approved by
Nagappa D Thalavar	Sathiyaseelan S	Shashidhara
Test Engineer	Test Engineer	Functional Head

Report Number DPO 1838MIL338	ENVIRONMENTAL TEST REPORT	Page 4 of 20

This report should always be reproduced in full. Any extracts of this report is invalid.

3. PCB Enclosure

Design, Develop and manufacturing of ruggedized PCB enclosure in Aluminum to meet Military requirements. Thecomponent has been designed, machined, anodized and delivered to suit the available PCB.

3. PCB Enclosure

Design, Develop and manufacturing of ruggedized PCB enclosure in Aluminum to meet Military requirements.
The component has been designed, machined, anodized with Key Pad and delivered to suit the available PCB.

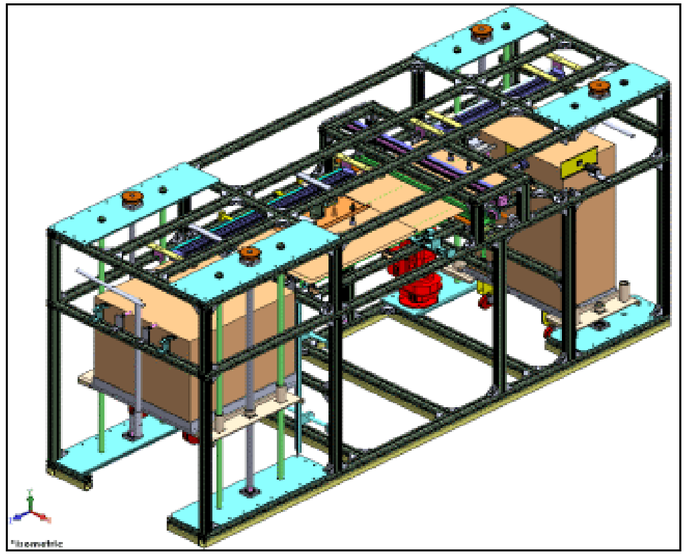
Integrated Design & Manufacturing

Full Equipment Design & Manufacture

CASE STUDIES (Defense order contact person details appended)

1.Card Cutting Machine	Manipal technologies
2.Ink Drying Machine	Manipal technologies
3.Security entry system	Tube stile Manipal technologies
4.Vacuum Furnace Heat Shield	Nuclear Fuels Complex
5.Glove Compartment (2 variants)	BARC & IGCAR
6.Hybrid Machine	Manipal technologies

Sheet Cutting Machine



Full machine View

Actual Product

Replacement of a vintage machine with improved features, incorporation of state of art technology- HMI & data logging and parameter settings through PLC based system and above all reliable and compact

Main Features of Assembly

1.Feeding sub assembly

2.Traverse sub assembly at Feed end

3.Conveyer sub assembly

4.Cutter sub assembly

5.Traverse subassembly at delivery end

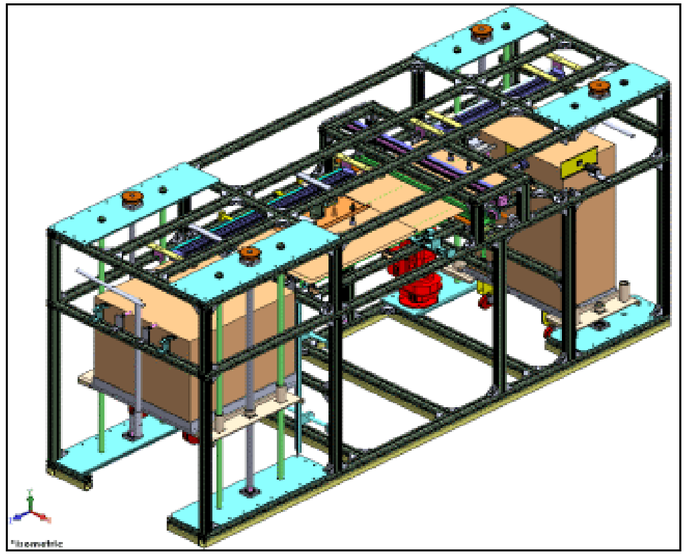
6.Delivery stack sub assembly

7.Motor and its mounts

8.Trollies

9. Electric & PLC panels

2. UV Curing Machine



Full machine View

Actual Product

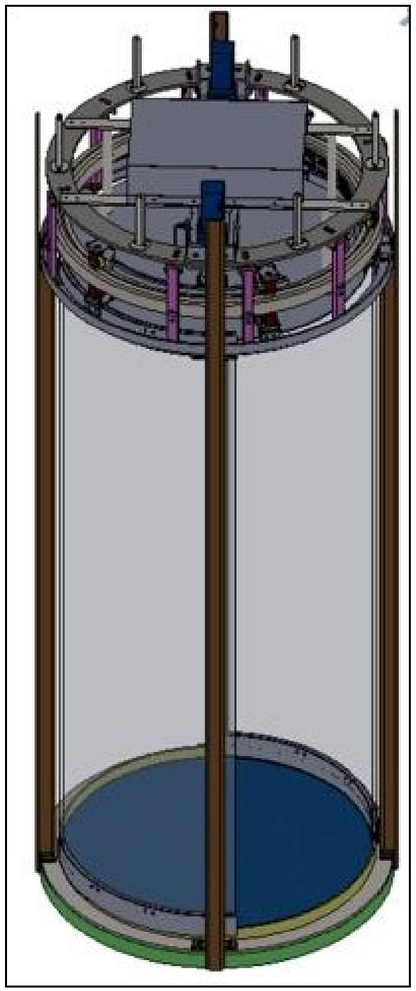
Delivery:

To design and manufacture an Ultra Violet printing ink curing machine within the constraints of available space and to enhance productivity. Dual UV light provision was made to handle a variety of prints.

Main features of UV curing machine are

1. Structural Sub assembly.
2. Wheel Assembly.
3. Conveyer & Stainless steel air blow box.
4. Hydraulic lifting mechanism to facilitate easy maintenance.

3. Secure Entry System

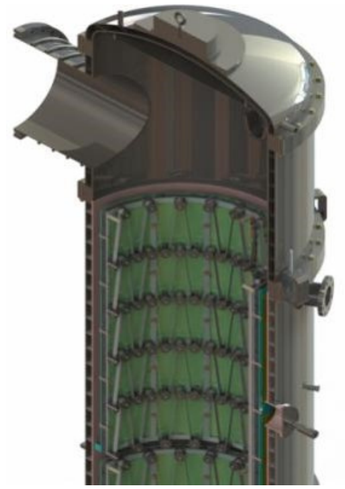


Design Stage

Under Manufacturing & Testing

A tube stile was designed, developed, manufactured & installed to enhance entry and exit security with following features.

- Dual door with logic to prevent unauthorized entry.
- Entry authentication through Biometric / RFID
- Scanner to detect concealed metal and RF items.
- CC Camera interface to record all entry and exit.
- Automatic weight recorder to detect abnormal or two persons entering under single authentication.
- Refusal of exit door opening on detection of abnormality.
- Emergency exit in case of any adverse situation
- PLC based programmable operation.
- Attendant free operation / remote monitoring and control



Under manufacturing.

Only 1 unit out of 3 is assembled

4. Vertical Vacuum Furnace

Improvements to existing design to overcome thermal shield deformation and bring in additional safety features to existing 10 m tall vertical vacuum furnace.

- Radiation shield redesign to overcome deformation including method of anchoring.
- Validation of design as per ASME code.
- Cooling arrangement modification for better & uniform cooling.
- Extraction of Manufacturing drawings.

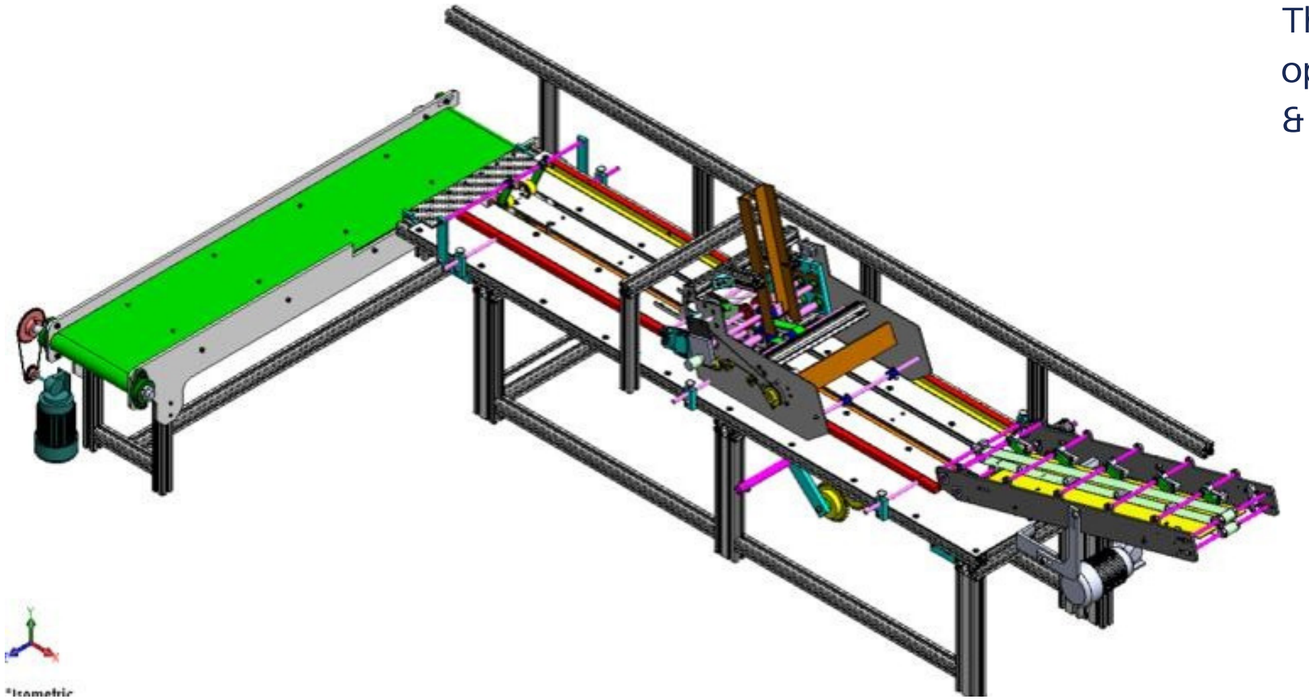
Under Manufacture

5. Dual Glove Box

Design, development and manufacture dual glove box system for handling hazardous materials. Additional features provided are

- Remote control of hazardous container movement
- Poor vacuum alarm
- PLC based operation

6. Hybrid Machine



The hybrid machine was designed to handle following operations on completion of printing operations of cards (Credit & Debit Cards)

1. On line scanning for print errors vis-a- vis master file data.
2. Magnetic embedded information authentication against program.
3. Auto rejection of defective cards with alarm and data logging to facilitate reprinting.
4. Auto stacking of good cards.

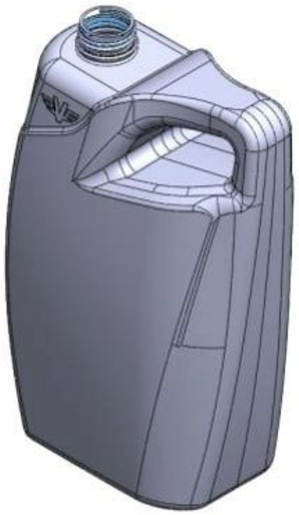
Under Manufacture

Design & Rapid Prototyping

Rapid Prototyping

CASE STUDIES (Defense order contact person details appended)

1. Oil containers
2. VVPAT
3. Process Plant items



1. Rapid Prototyping

Design of a variety of liquid containers for the customer to pick and choose a design of their choice and thereafter to check the strength for liquid holding and stacking requirements. Successfully manufactured the product using 3D Printing Technology.

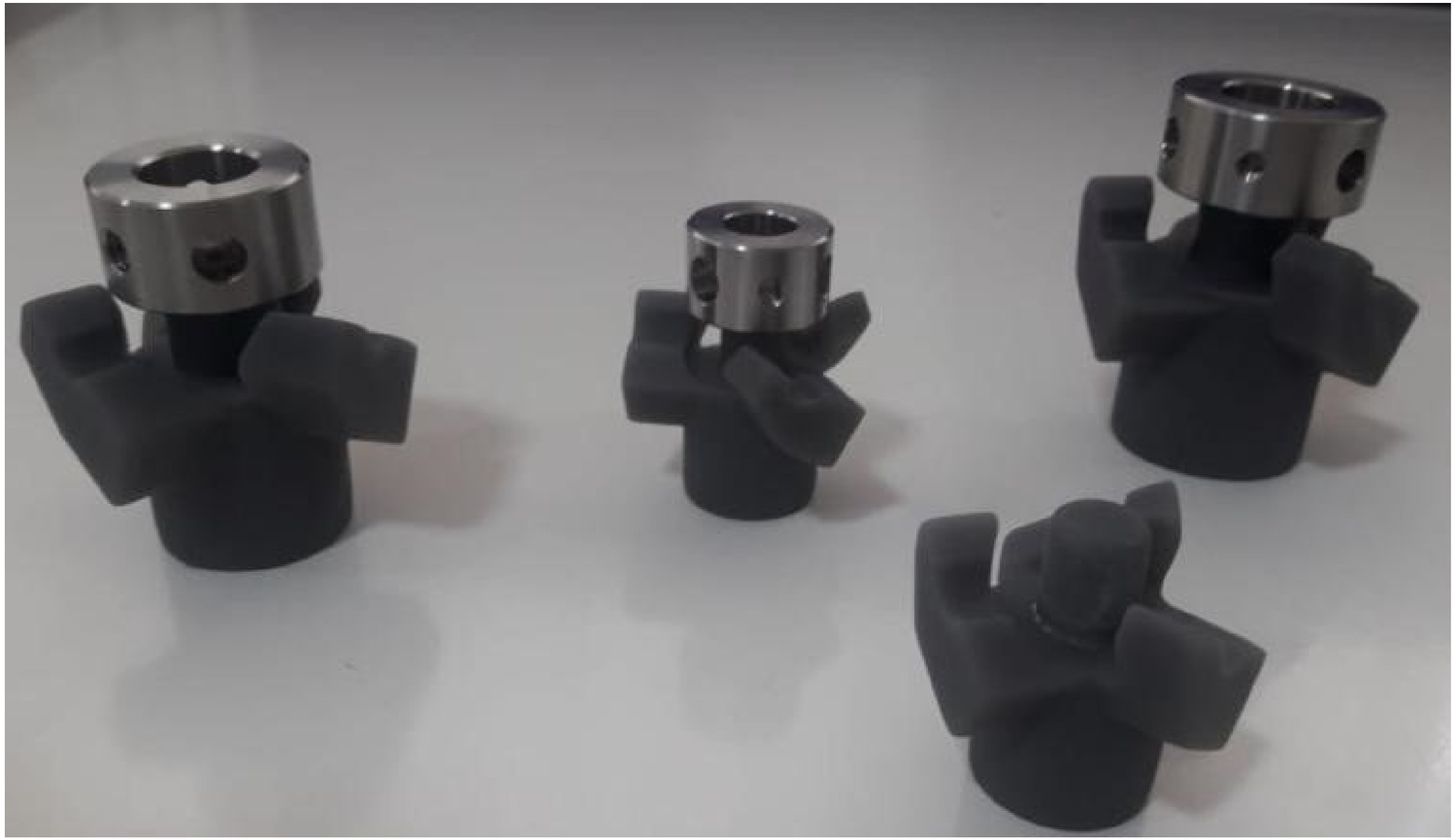
2. Rapid Prototyping

Manufacturing of enclosure for Voter-verified paper audit trail (VVPAT) using 3D printing technology & screen printing of the details over the enclosure.

Prototype order from BEL

3. Rapid Prototyping

Rapid prototyping of various ASME class fittings to facilitate mock up assembly at shop floor prior to installation at customer end for Voter-verified paper audit trail (VVPAT) using 3D printing technology & screen printing of the details over the enclosure.



FLUID FLOW ANALYSIS

Wind Flow Analysis

CASE STUDIES

1.Aircraft mounted fixtures- ASTE/ Indian Airforce

2.Flow Analysis of rail roof top AC – Faivieley rail road division

3.Compartment level heat analysis –BEL

4.Flow analysis water purifier–SP Engineering

5.Hydraulic Turbine efficiency and flow corrections- BFL

6.Hydraulic induced vibration analysis -Sartorius

7.River Flow and fitment of Kaplan Turbine BFL

8.Ventury Analysis & Filter back pressure analysis Filtrex & SSD Minneapolis

9.Pipe flow and water hammer analysis- Shand Group

10.Pump analysis- Nuclear Fuels Complex

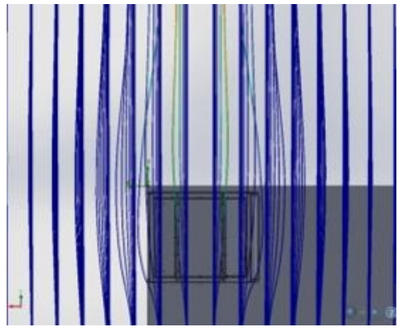
11.Ship flow analysis Pipavav ship yard

1. CFD-Wind Flow

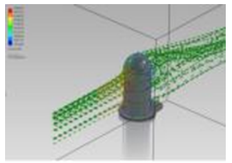
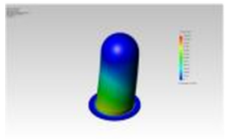
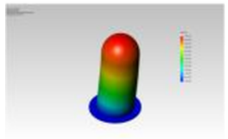
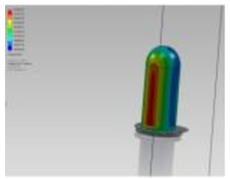
Project Objectives

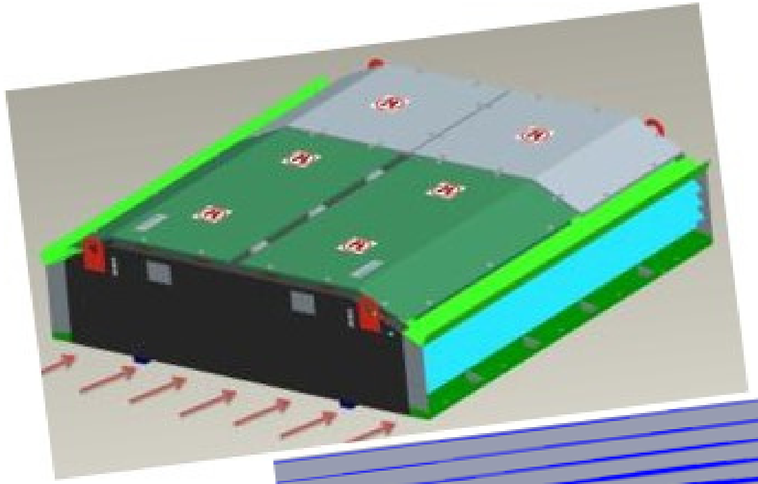
1. Analysis of wind loading and the stresses on a Composite Radome antenna to be placed on an aircraft.

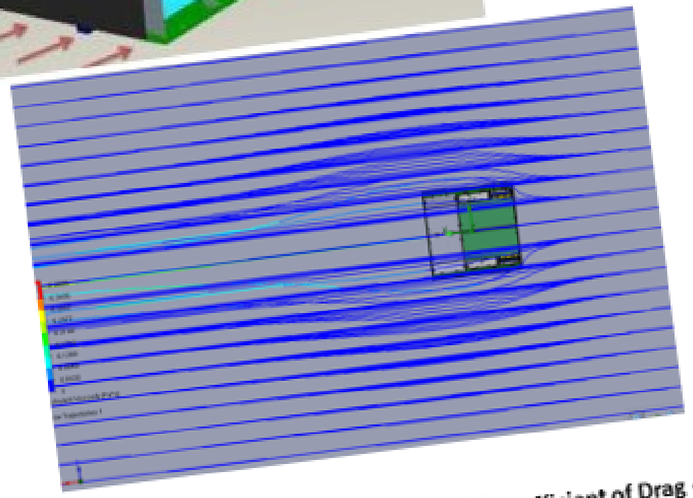
2. Rolling stock drag analysis.

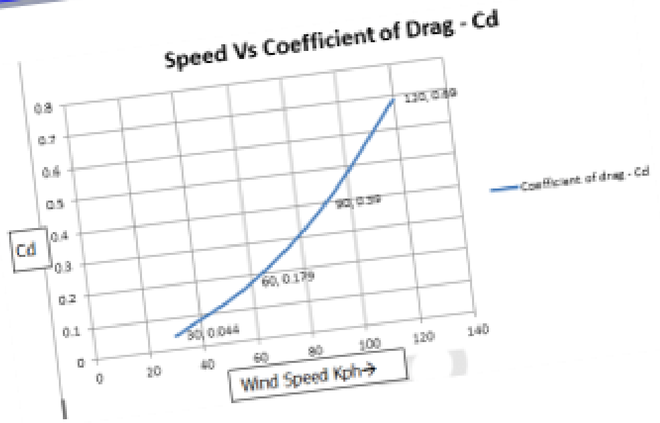








2. CFD- Air Flow

Drag force estimation on roof mounted a/unit

Client : Rolling stock manufacturer and wanted to estimate the bought out a/c unit when mounted on roof top can withstand wind drag force at 130 kmPH speed.

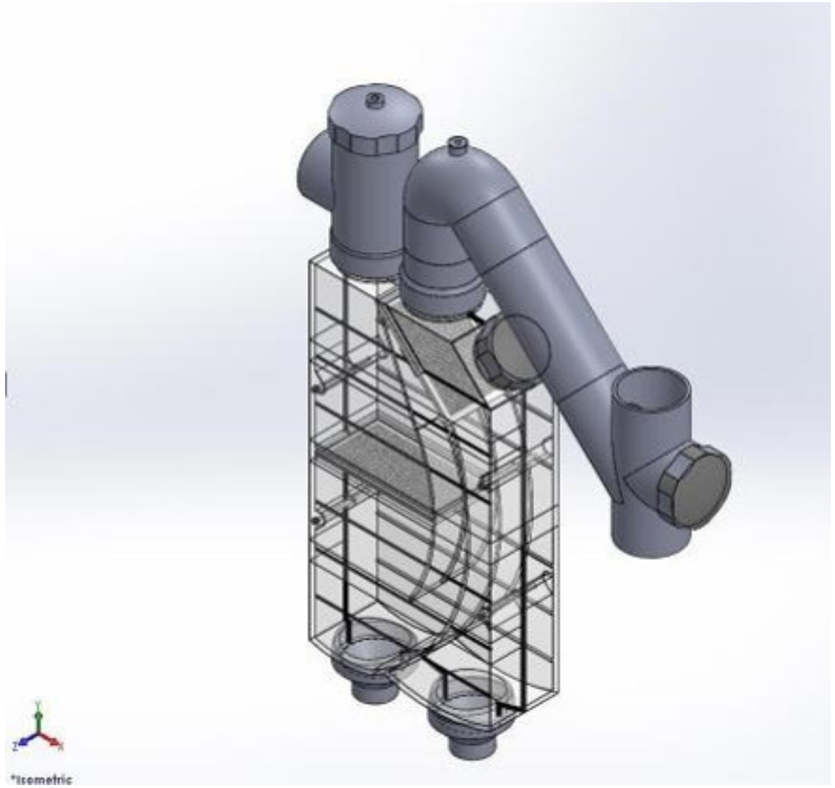
Input: 3D assembly model and holding down arrangement.

Output: Arrived at force exerted on the front and rear face of unit, Worked out Coefficient of drag (Cd) for the unit and recommended bolt sizes to Bolt sizes/ fasteners to withstand wind forces.

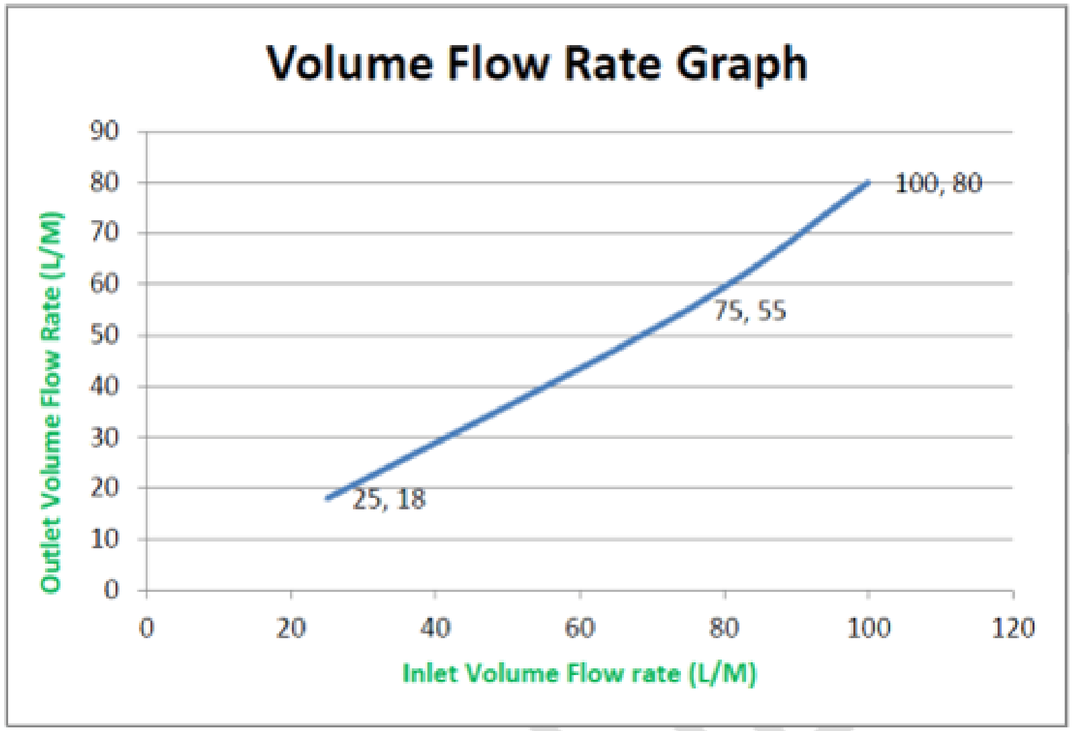
Covenant Standards: Publications and Journals, NES & GES

3. CFD- Flow Design

FLOW DESIGN – Rain Water Harvesting filters for high rise buildings

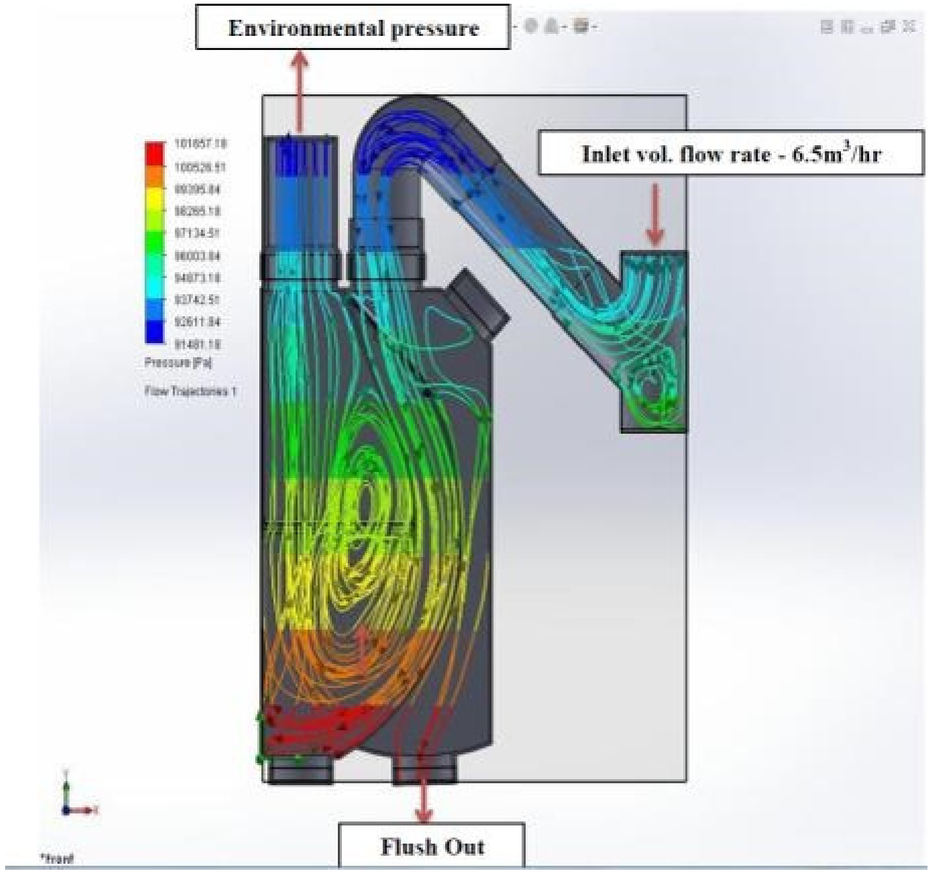


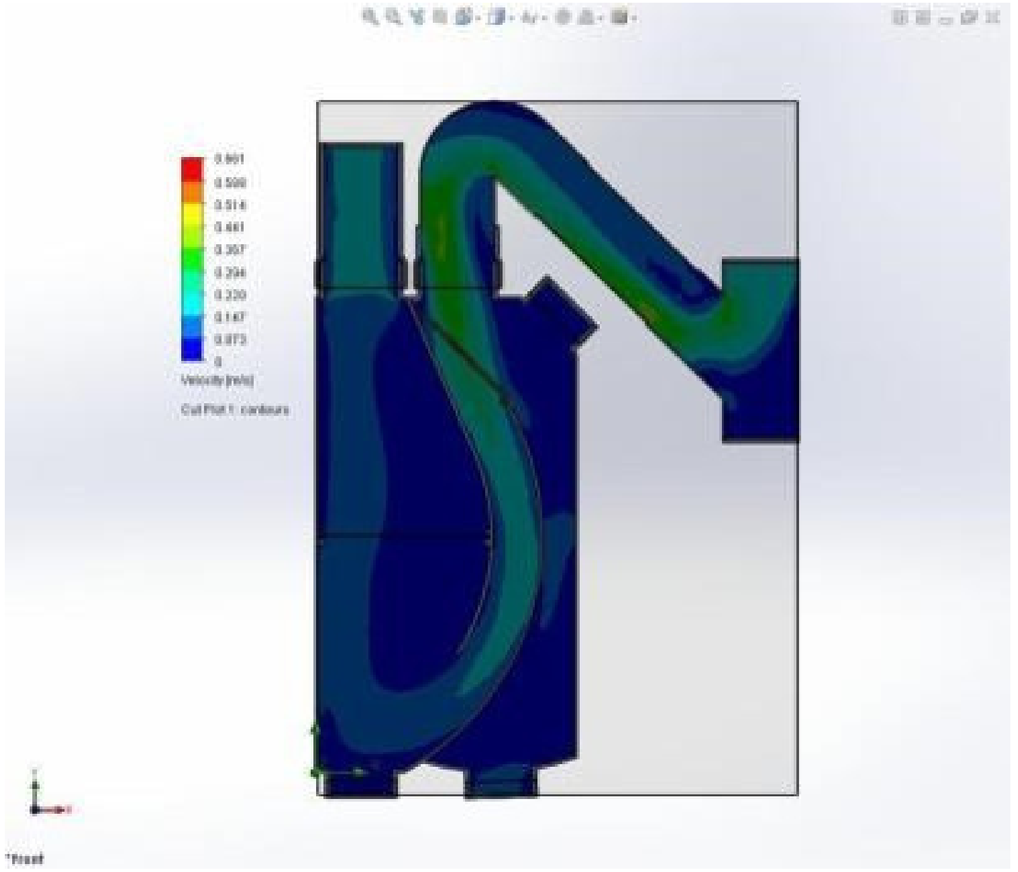
1.1. Flow results



Panorama of Projects – CFD Flow Design

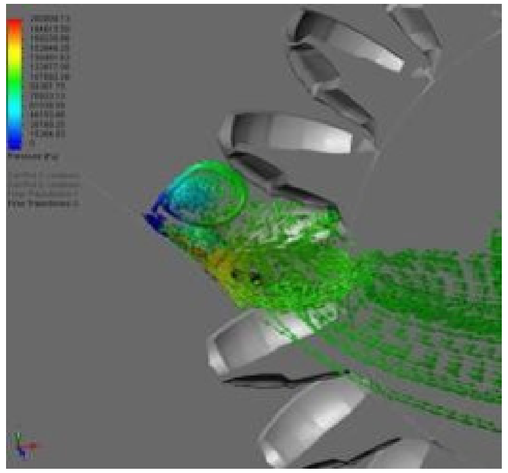
FLOW DESIGN

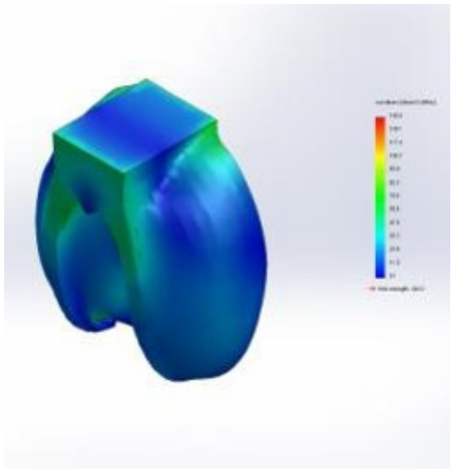




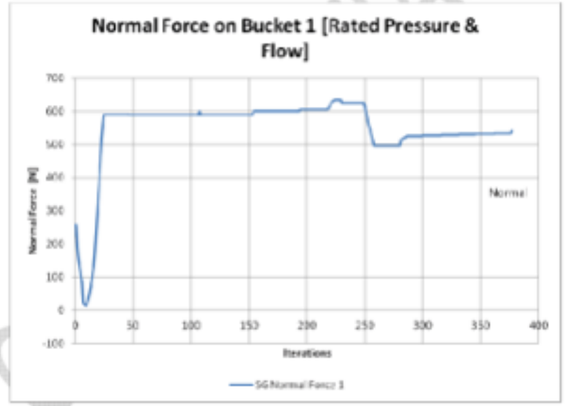
4. CFD-Estimation of Turbine Efficiency

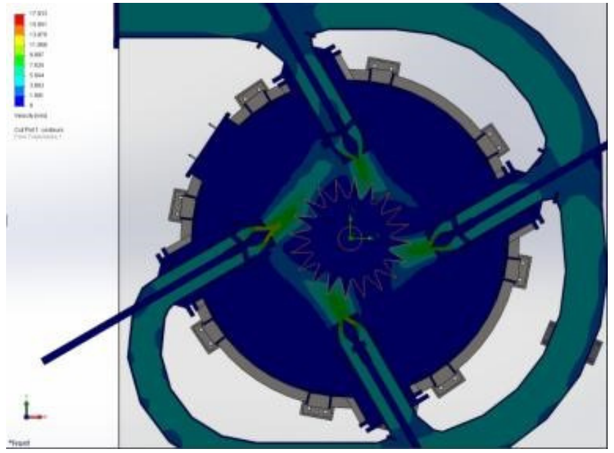
PELTON TURBINE

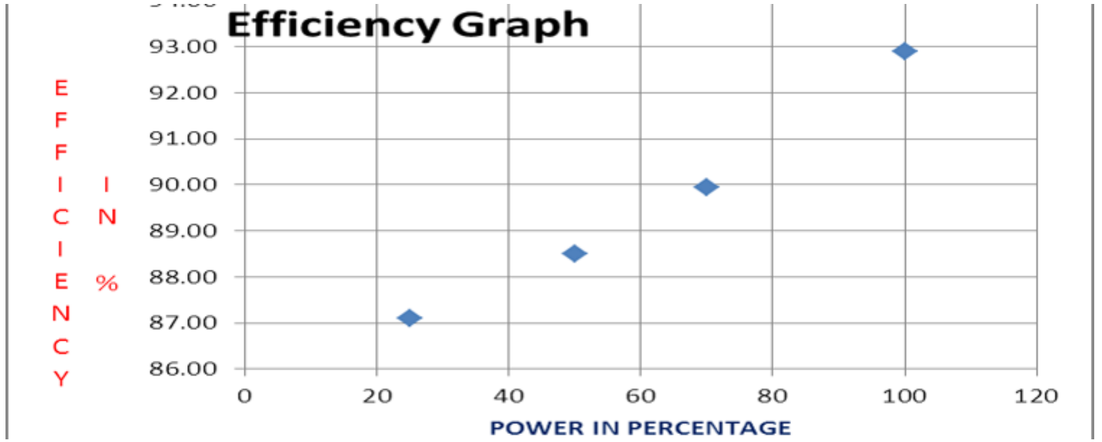


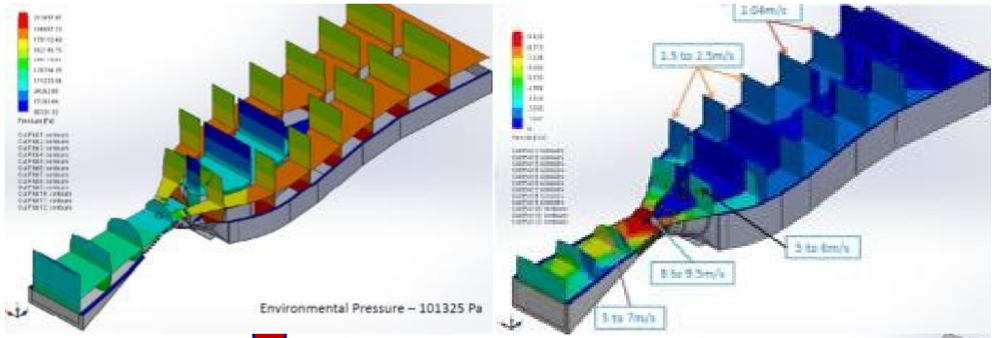


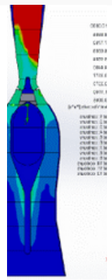
Normal Force o bucket 1	[N]	550.3546428
Radial Force on bucket 1	[N]	166.8060408

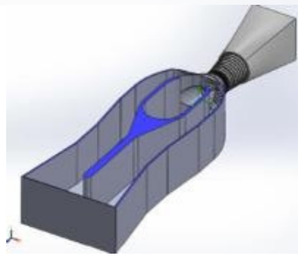


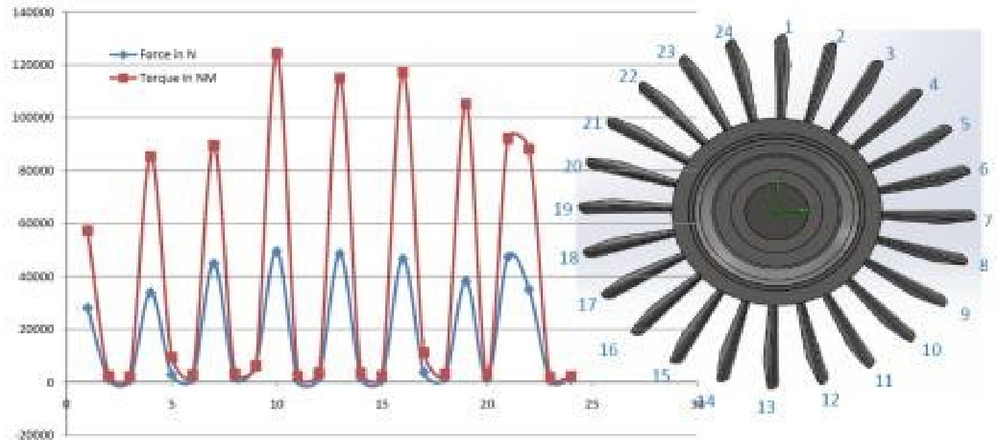












CFD-Estimation of Turbine Efficiency

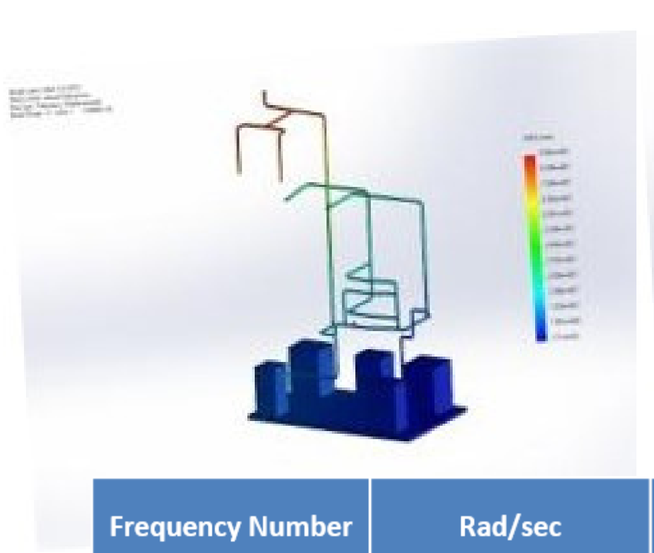
Flow analysis and efficiency calculation for Pit turbine

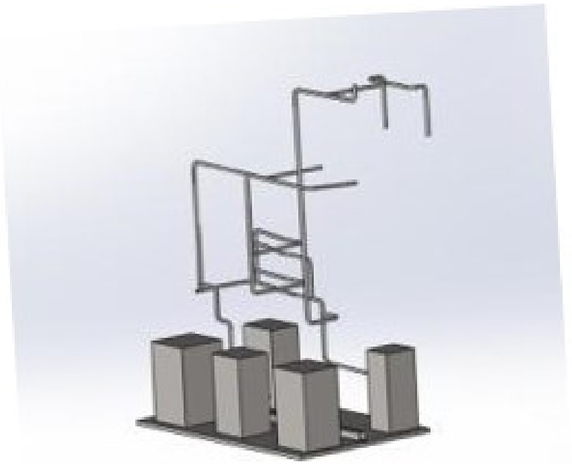
Client : Hydro Power equipment manufactures
Scope of work: To find the flow characteristics for the hydraulic pit passage. Blade torque and vane torque calculation is the aim of this study.

Input: 3D assembly model.

Flow specifications
Application data

Output: : Arrived flow characteristic like velocity, pressure and viscosity across the pit passage. Force/torque excreted on the guide vanes and rotor blades are observed. The hydraulic efficiency is arrived through CFD results and the same is confirmed by classical approach.





Frequency Number	Rad/sec	Hertz	Seconds
1	6.2038	0.98737	1.0128
2	6.9551	1.1069	0.90339
3	12.687	2.0191	0.49526
4	13.938	2.2183	0.4508
5	15.495	2.4661	0.4055
6	20.755	3.3032	0.30273
7	25.557	4.0675	0.24585
8	30.019	4.7776	0.20931
9	33.305	5.3007	0.18865
10	34.144	5.4342	0.18402

5. High System Flow Vibration Defect Analysis

Project Description:

High vibration during fluid flow through lines; ASME B 31

Approach:

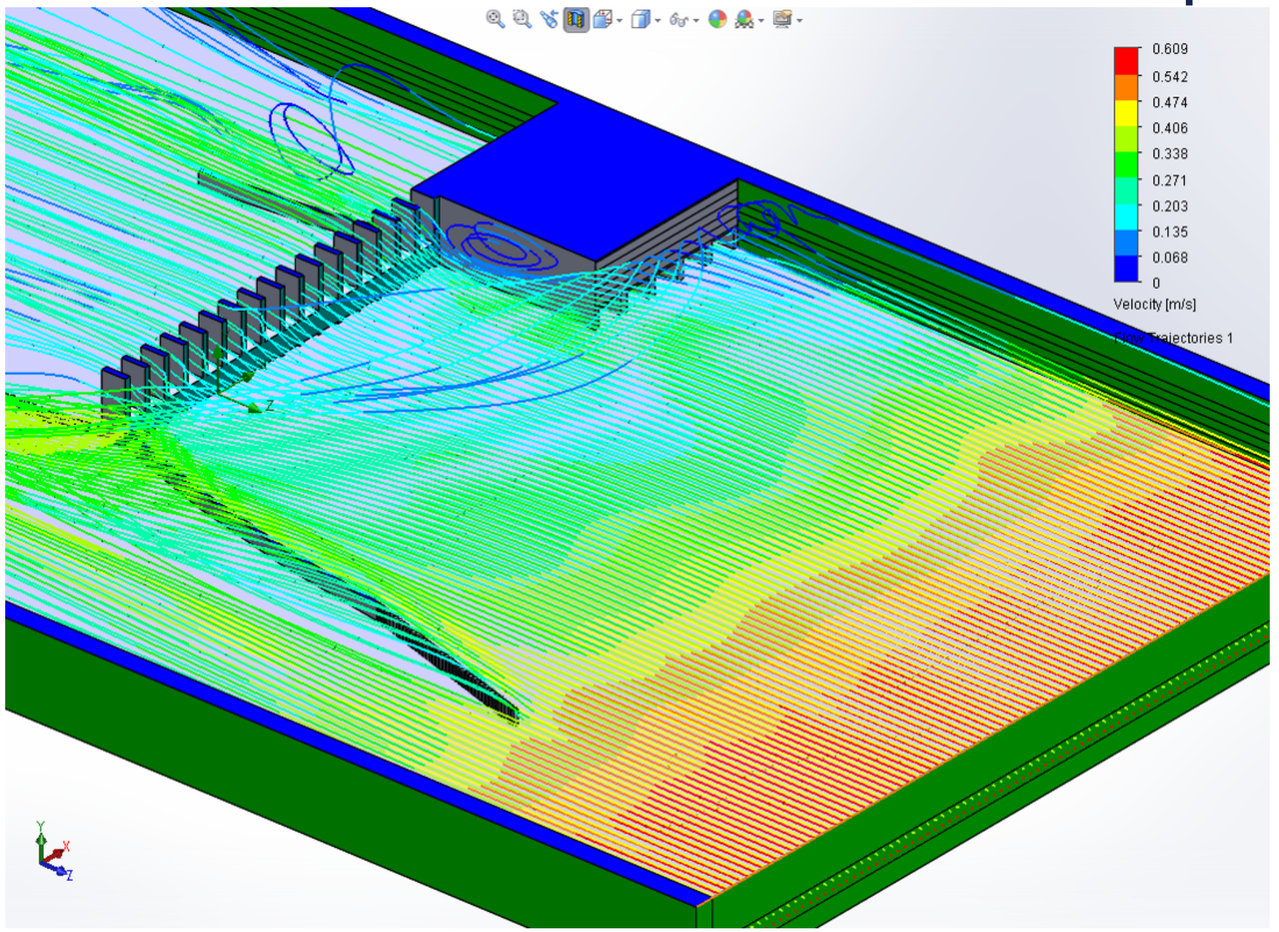
Arriving at natural frequency and superimposing with forcing frequency to arrive at hot spots and resonance.; BR 3021 & NES

Inference:

Short bend leading to high pre. Drop to be replaced by LR bend. Stiffening of pipe by providing pipe hangers at the top loop.

6. CFD – River Flow Analysis

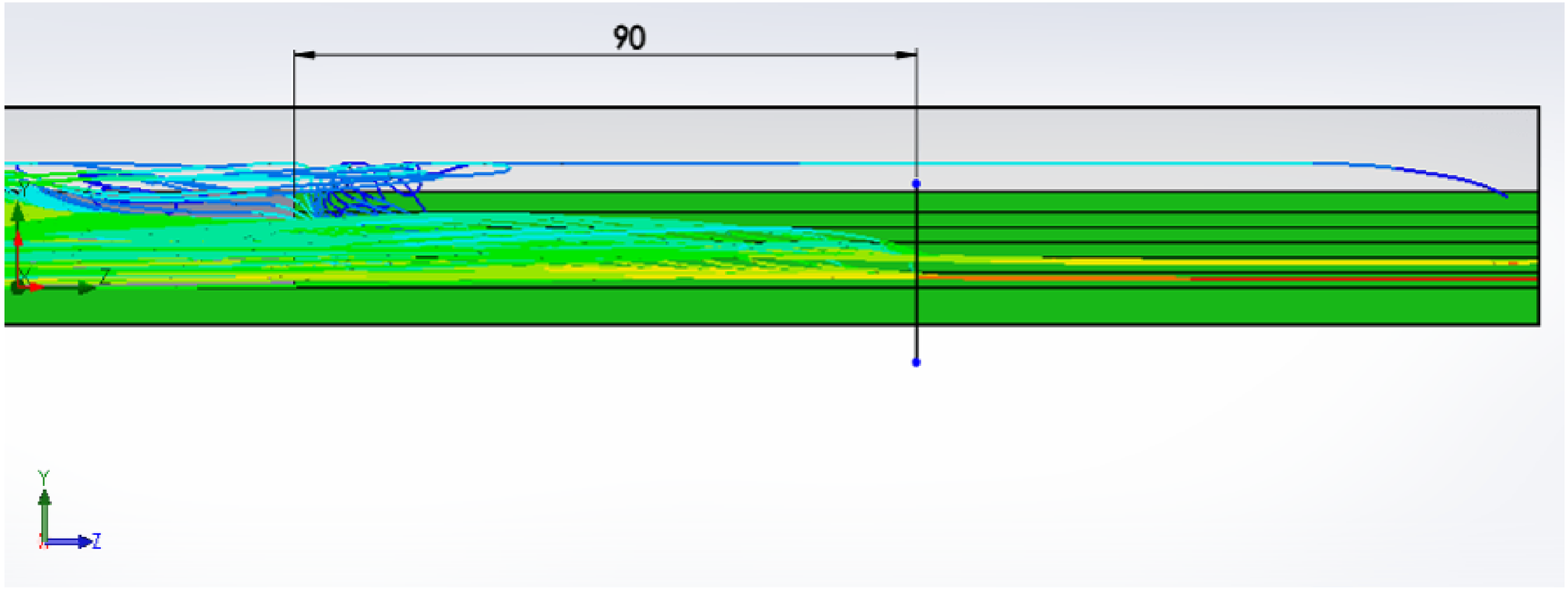
Estimation of virtual Head rise due to flow obstruction in river to power Kaplan turbine



CFD – River Flow Analysis

Client wanted the virtual head increase when a flow path obstruction is created so that this virtual head can be used for design of water turbine. Also they wanted to assess the water level increase along the flow path.

Water level is starts raising approximately 90m before the powerhouse wall

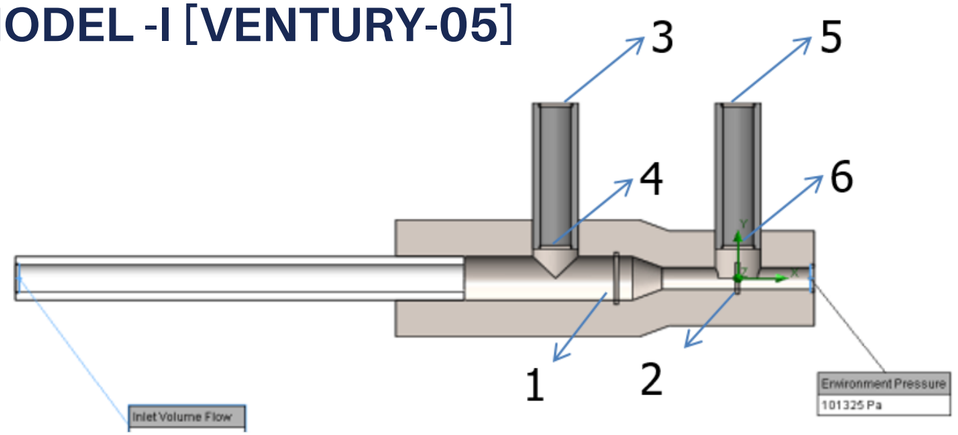


7. Ventury Analysis

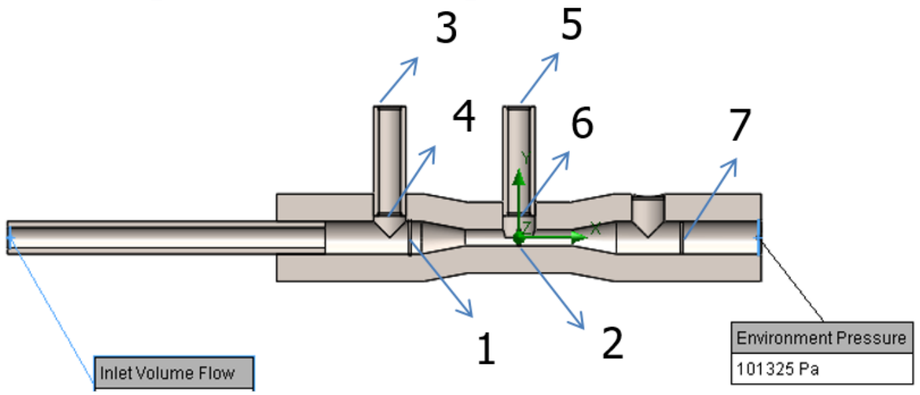
Ventury design through flow analysis

Sl. No	Area of Interest
1	Entry
2	Throat
3	Top - pipe 1
4	Bottom - pipe 1
5	Top -pipe 2
6	Bottom - pipe 2
7	Exit

MODEL -I [VENTURY-05]

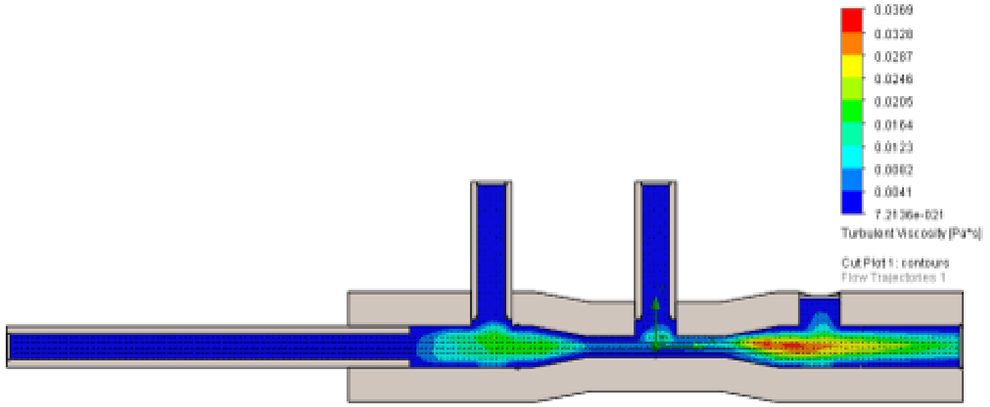


MODEL -II [VENTURY-06]

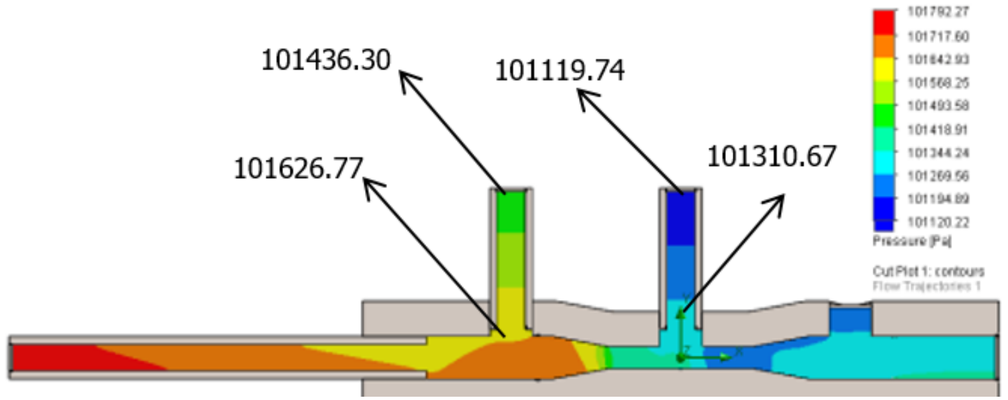


7. Venturi Analysis

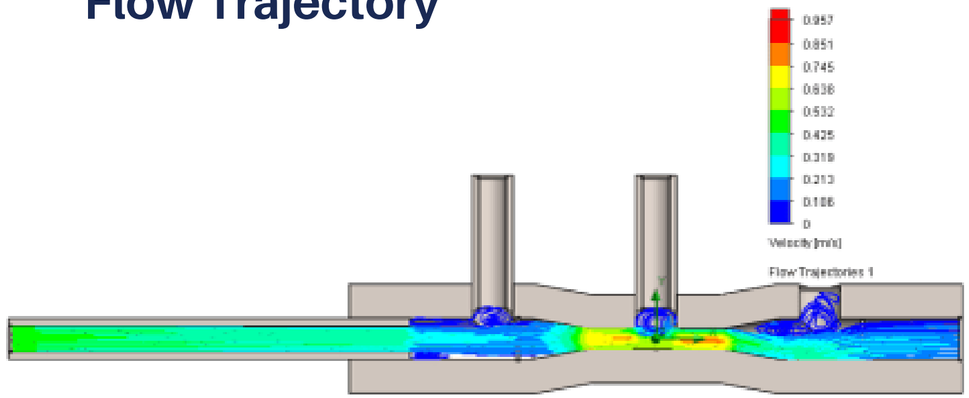
Turbulent Viscosity



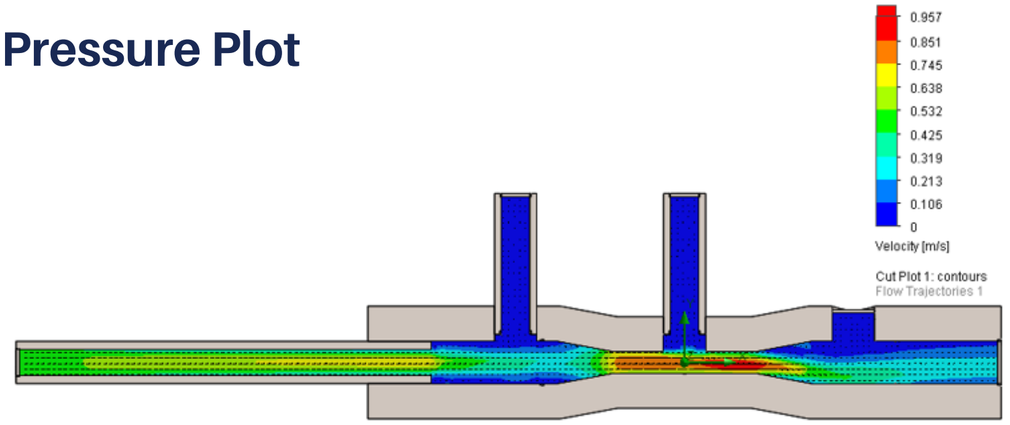
Velocity Plot



Flow Trajectory

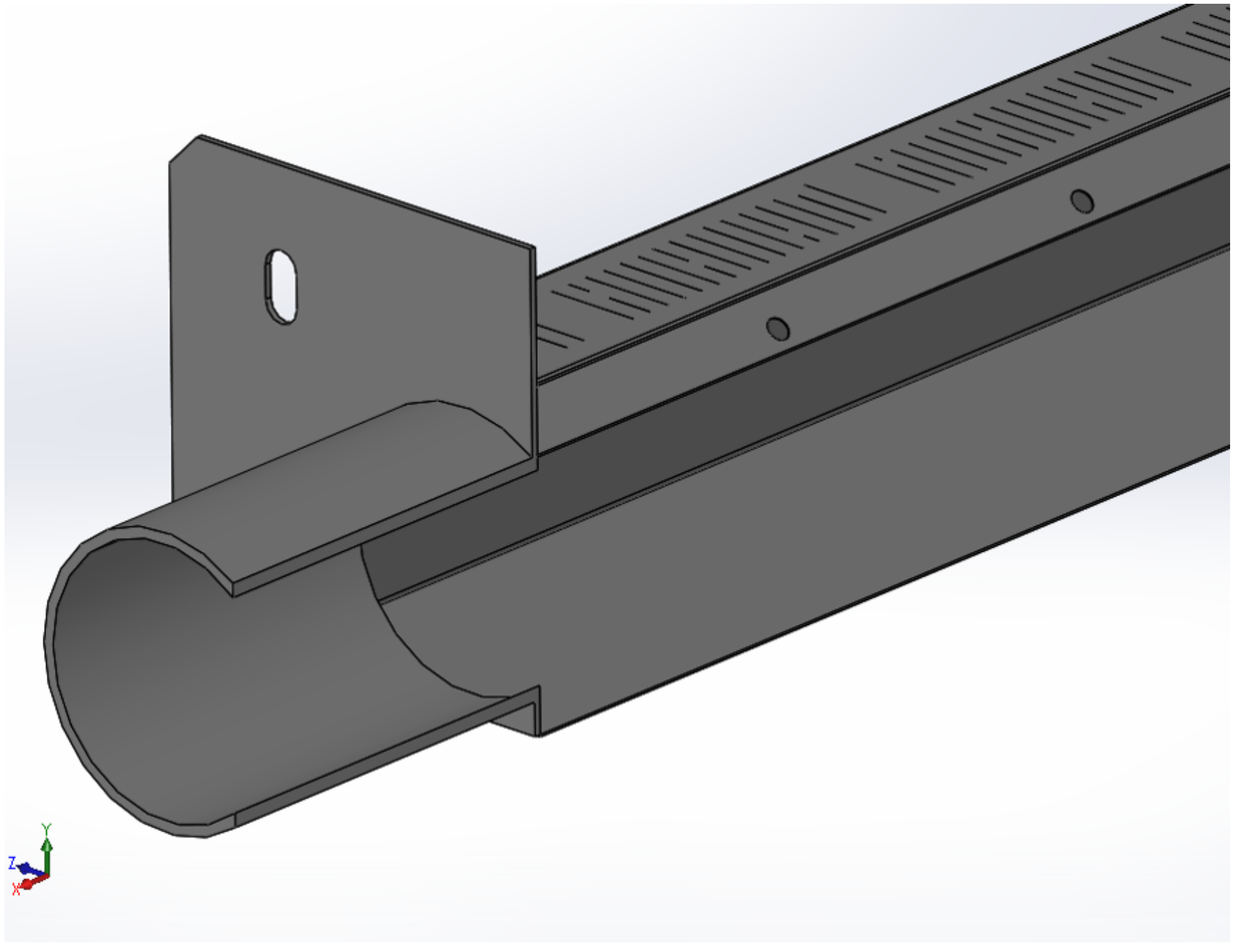


Pressure Plot

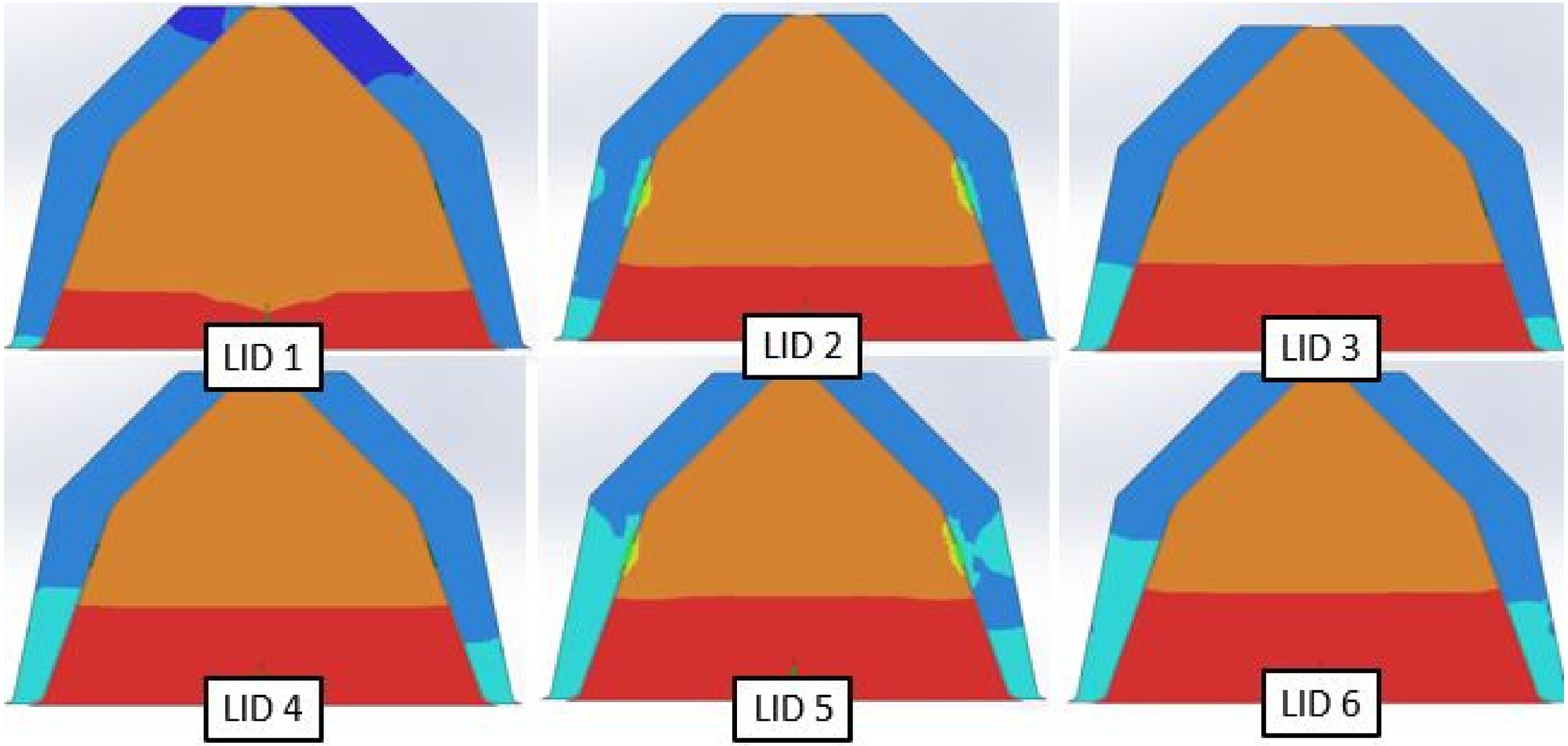


Water Flow Path

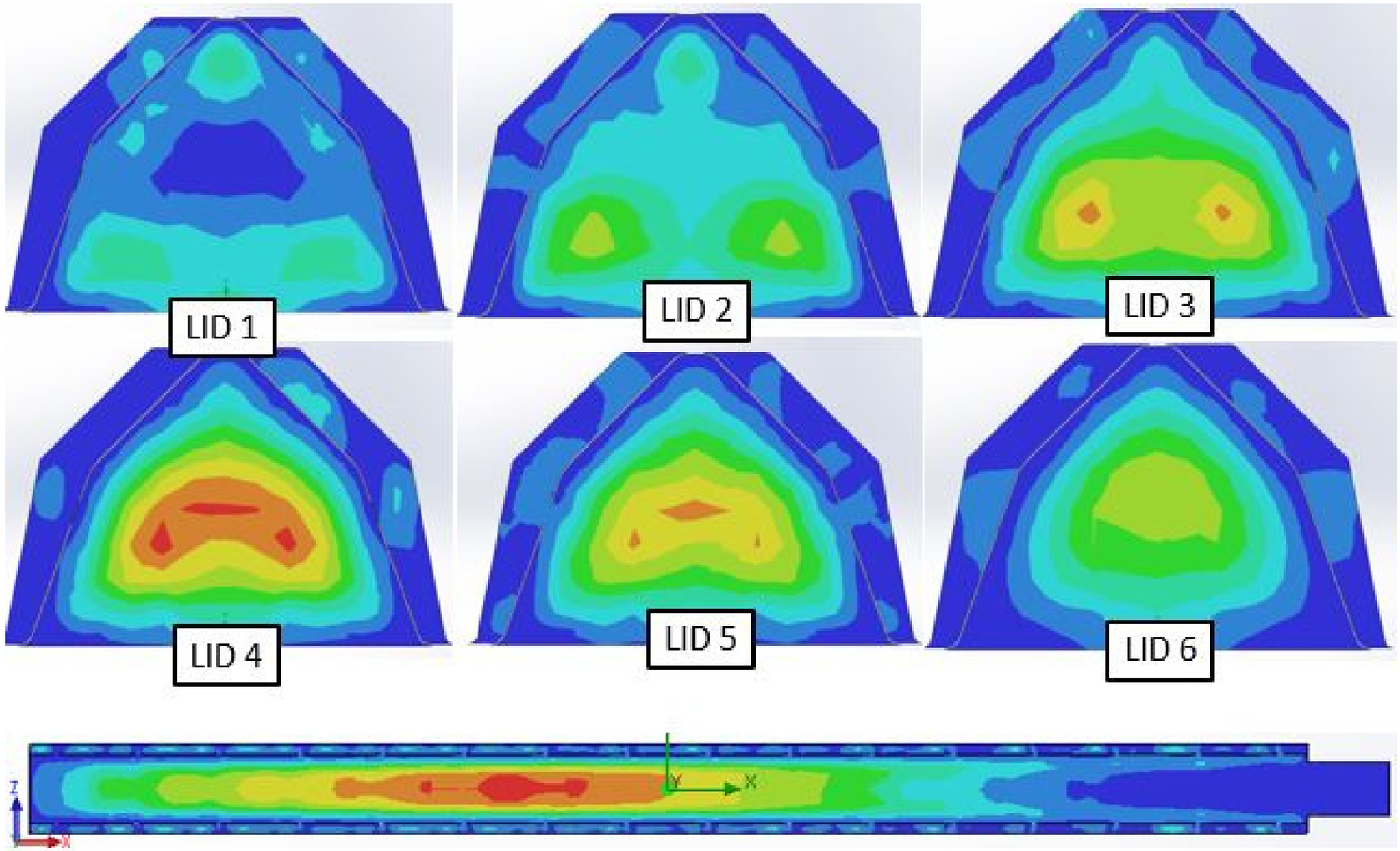
To Carry out CFD analysis to determine simulated flow conditions and to assess distribution pattern of water inside the filter housing.



Pressure Plot LID 1-6

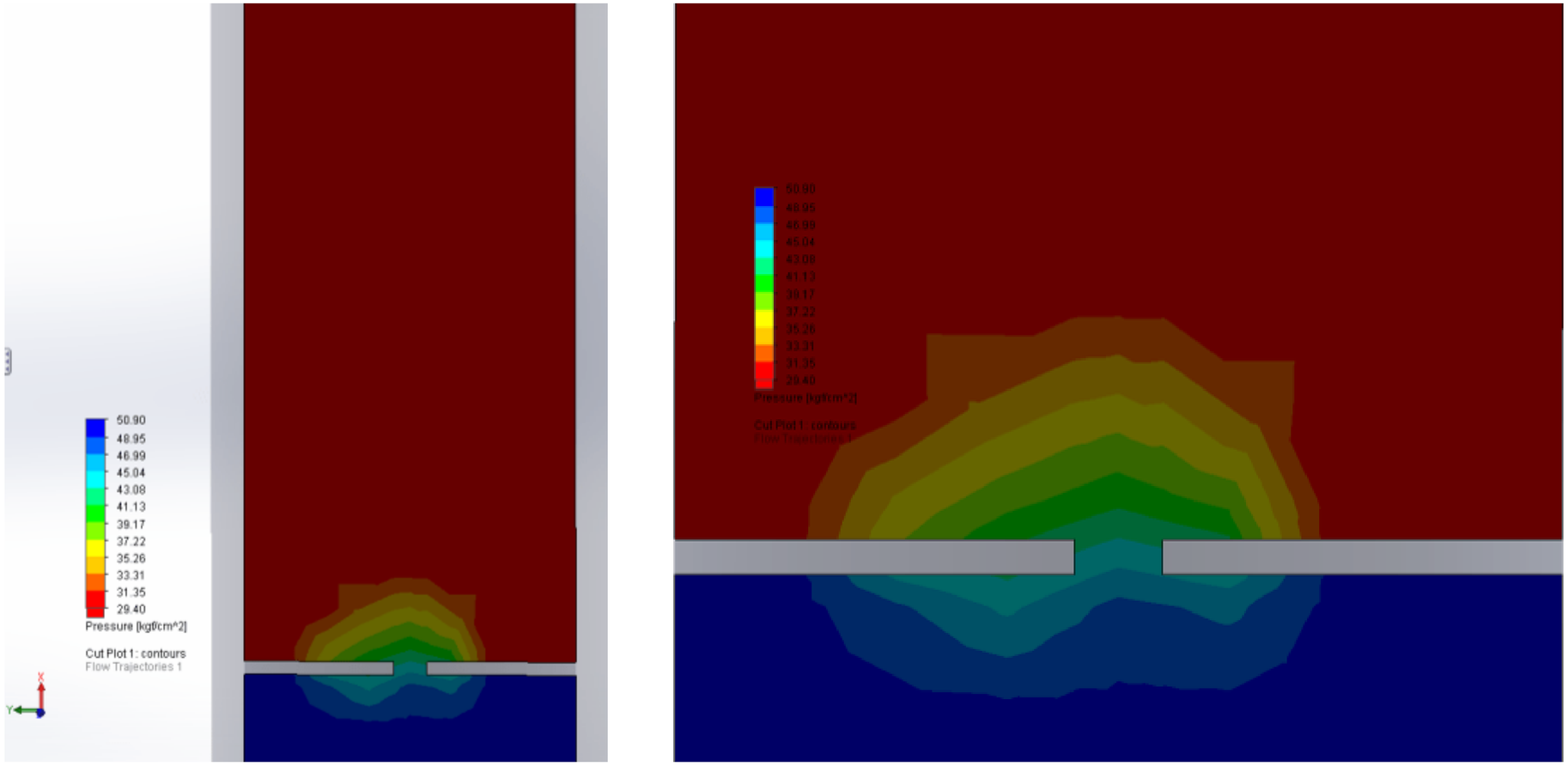


Turbulent Viscosity Plot LID 1-6



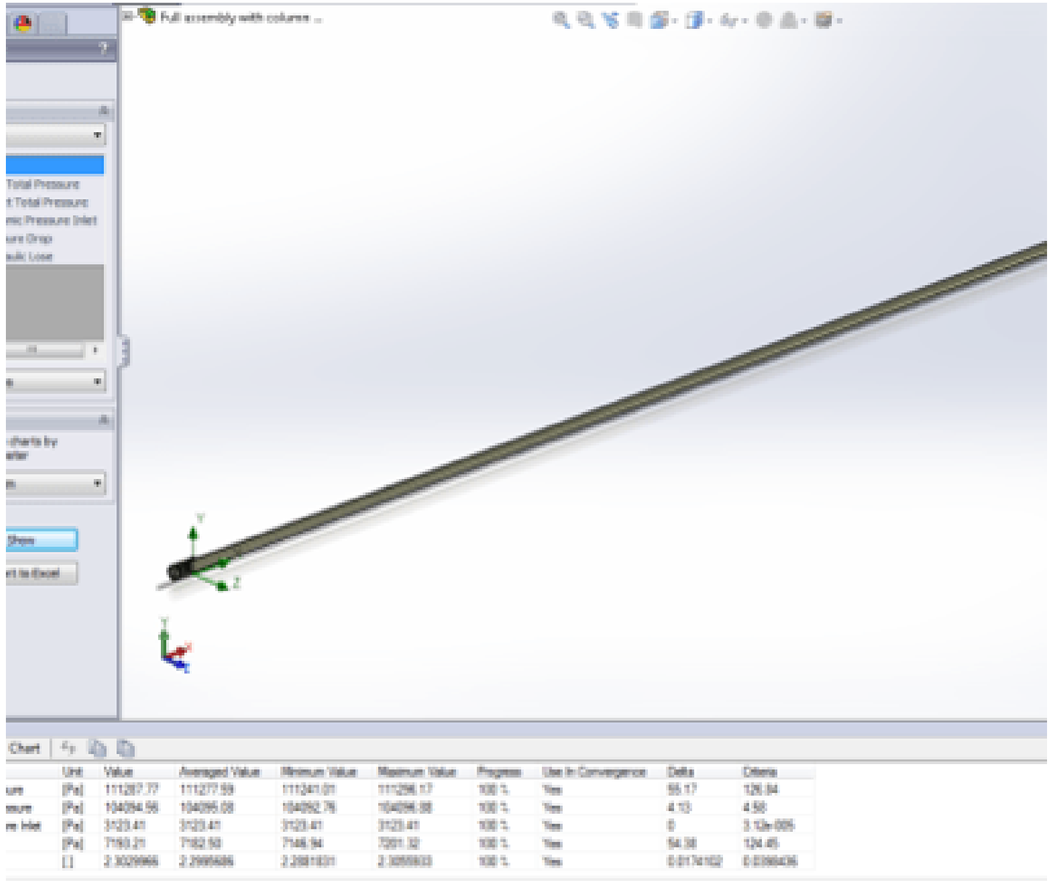
9. Water Hammer in pipe

PRESSURE PLOT- VALVE CLOSURE TIME 3 sec



Verification of CFD - Vis-à-vis Physical Test

Validation of CFD results vis-à-vis that of physical testing at IISC Bangalore



Sl.No	Parameters	Raksha pipe with turbulence free ring		As per calculation
		IISC report	As per CFD	
1	Flow rate Q (lps)	4.768	4.88 (ṁ)	5 (input)
2	Average Velocity, U (m/s)	2.311	2.484	2.44
3	Pressure difference (Pa)	6799	7145	6168
4	Reynolds number	128,936	110,663	

10. Hydraulic Analysis

Project Description:

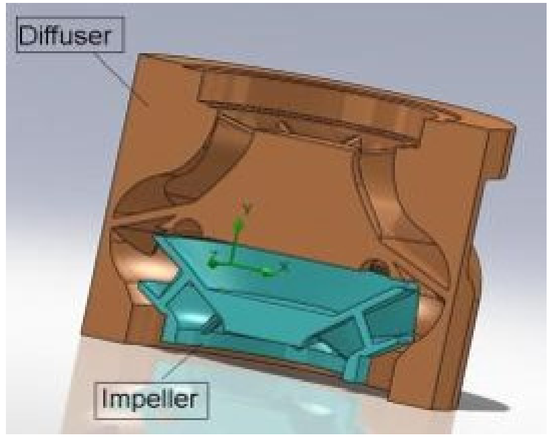
- Development of mixed flow pump
- Reduction in development time & Cost.

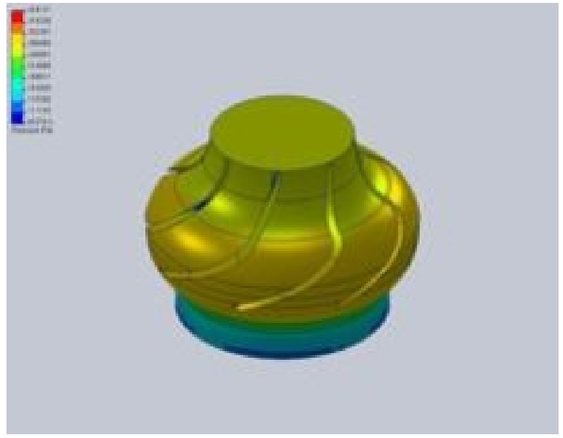
Approach:

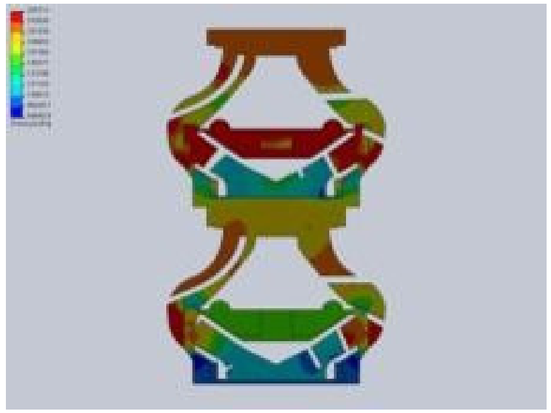
- Based on Flow simulation assessment of delivery parameters & optimization.
- Rapid Prototyping.
- Generation of Master Pattern of impeller & diffuser bowls.

Achievements:

- Reduced no. of trials
- Shortened development time.
- Improved design with better tolerance & achievement of predicted values.







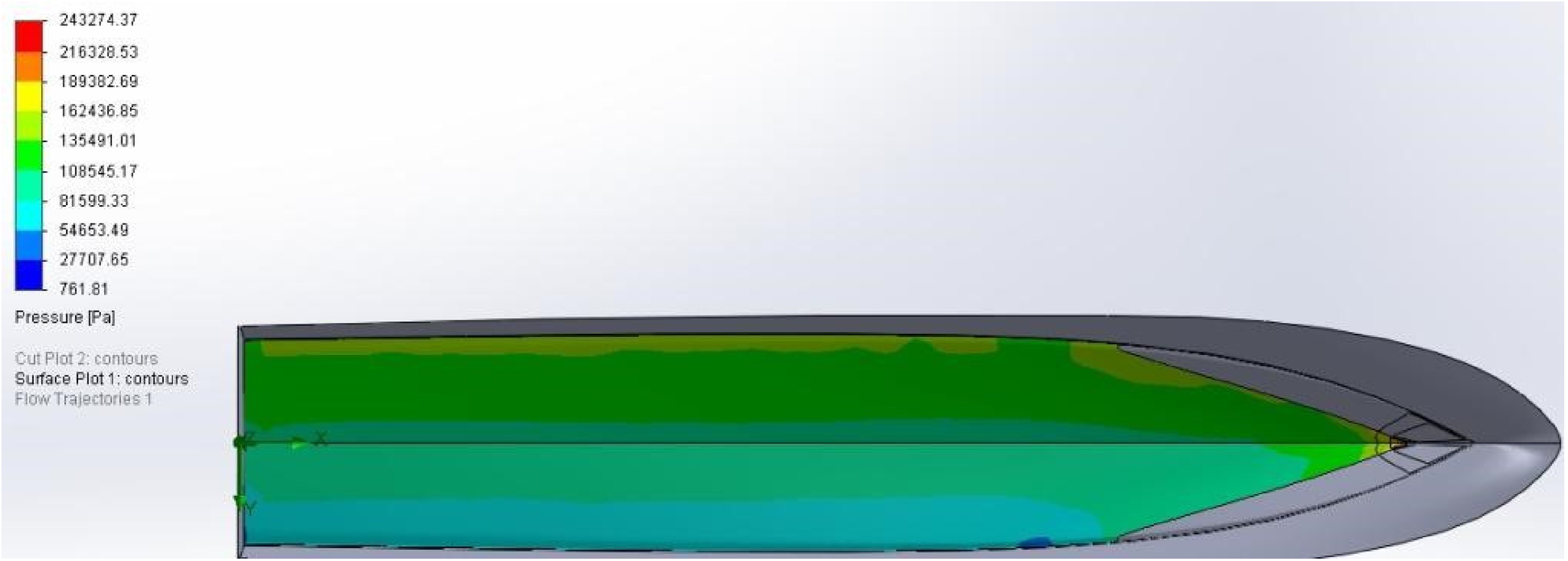
Hydraulic Analysis

Results:

- New model designed with improved characteristics [Flow Vs Head]
- Impeller vanes angles optimised to improve efficiency without compromise on delivery parameters.
- Two stage pump proposed and overall efficiency improved with savings in power.
- Maximum head obtained is 9.2 m (actual) and 9.32 m (flow simulation)
- Trials & tests conducted for two stage assembly validated the model.

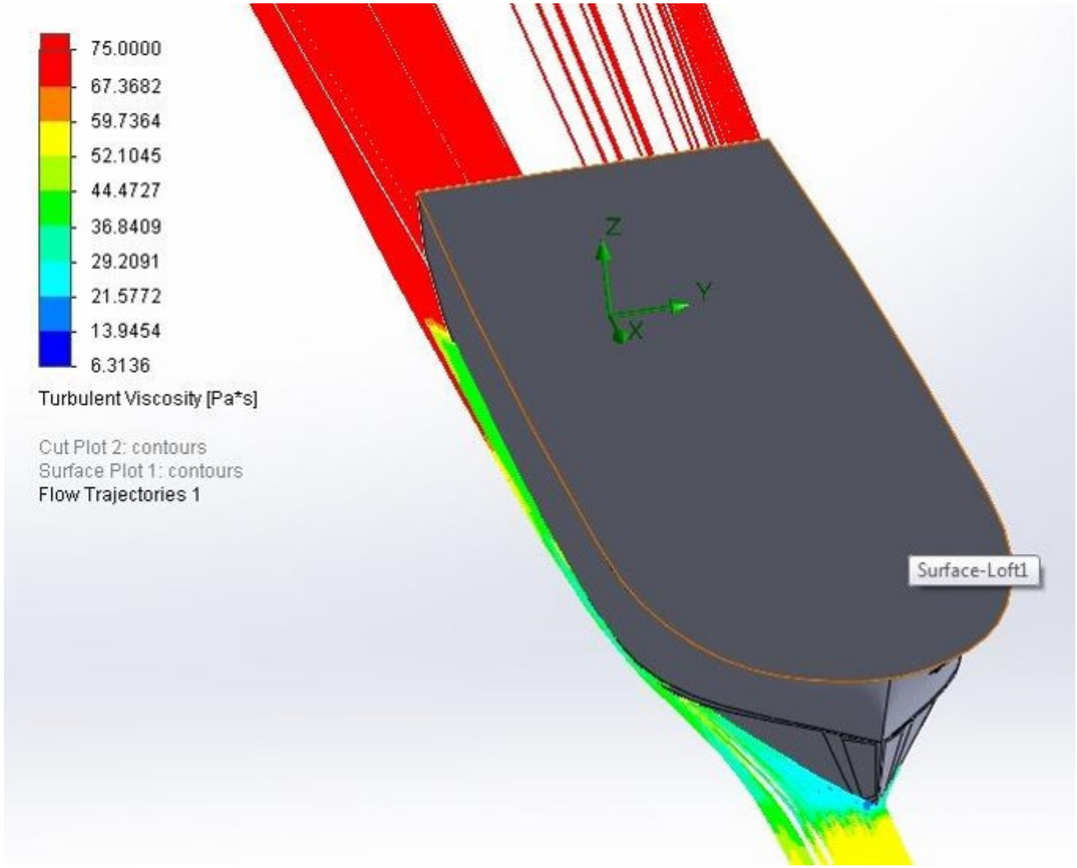
11. SHIP MOVEMENT CFD

Surface Pressure Plot



SHIP MOVEMENT CFD

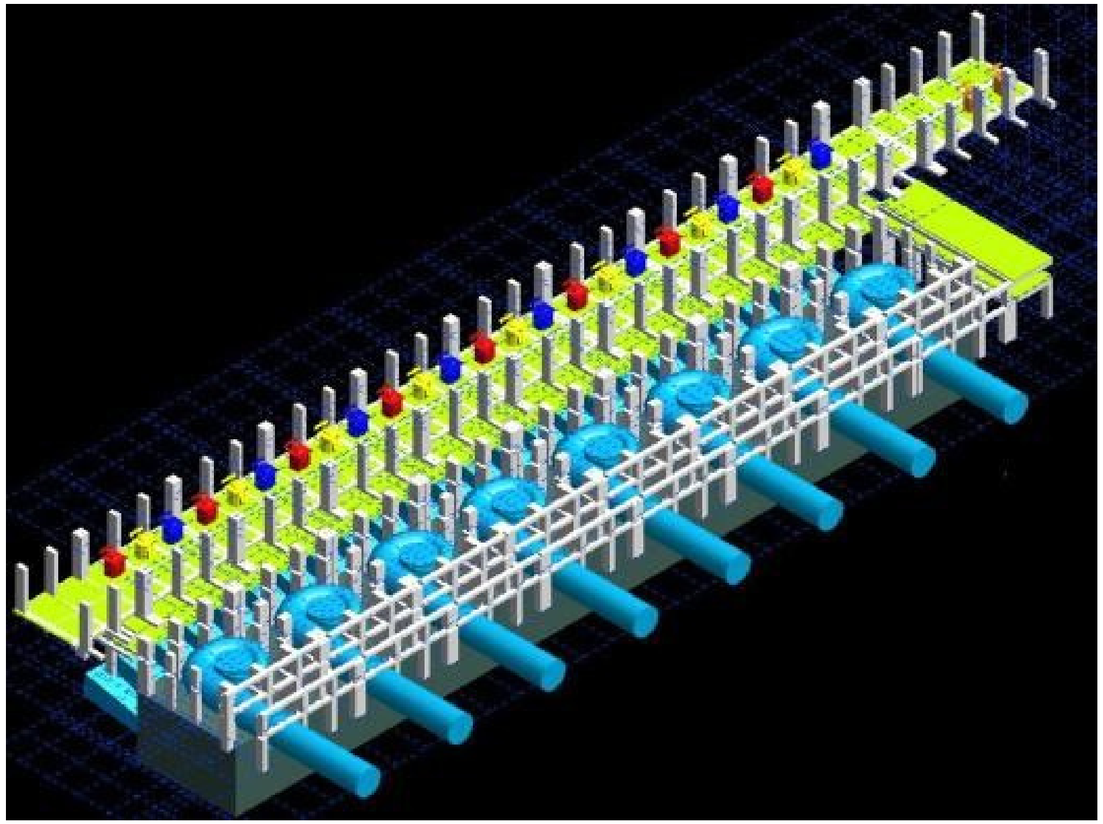
Flow Trajectory- Turbulent Viscosity Plot



STRUCTURAL DESIGN & ANALYSIS
(Sample 15 projects)

BOP Design- Hydro Electric Plant

A hydro power plant was carved in rock and hence had severe space constraints for Cooling Water, Fire Fighting, HP & LP air, electrical Cable Routing and other domestic services. BOP detail design undertaken

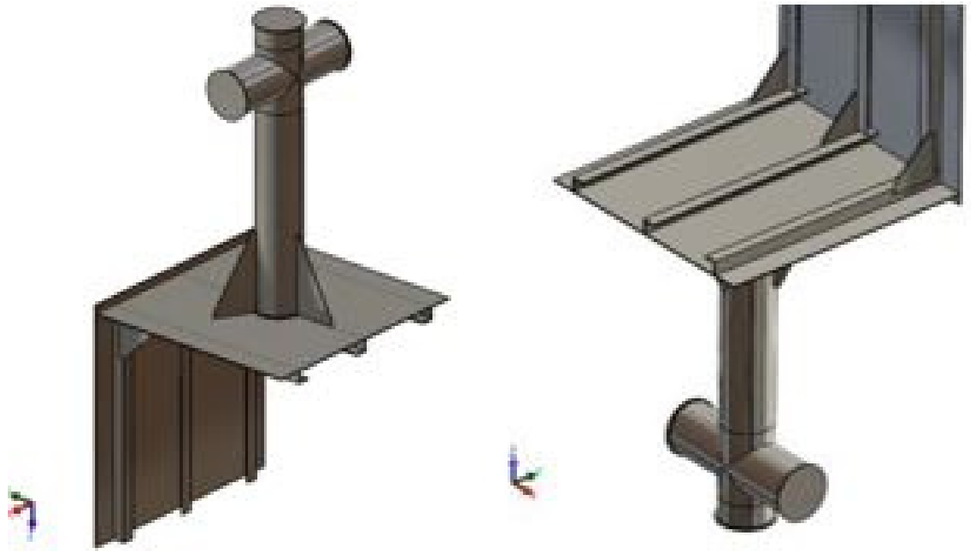


Analysis of Single Bollard

Aim:

To check the structural integrity of under deck structural members of the single bollard for thegiven design load conditions. Verify the existing structural design is strength enough to withstand the design load, if fails introduce alternate design for under deck portionto withstand the design load.

Existing Model

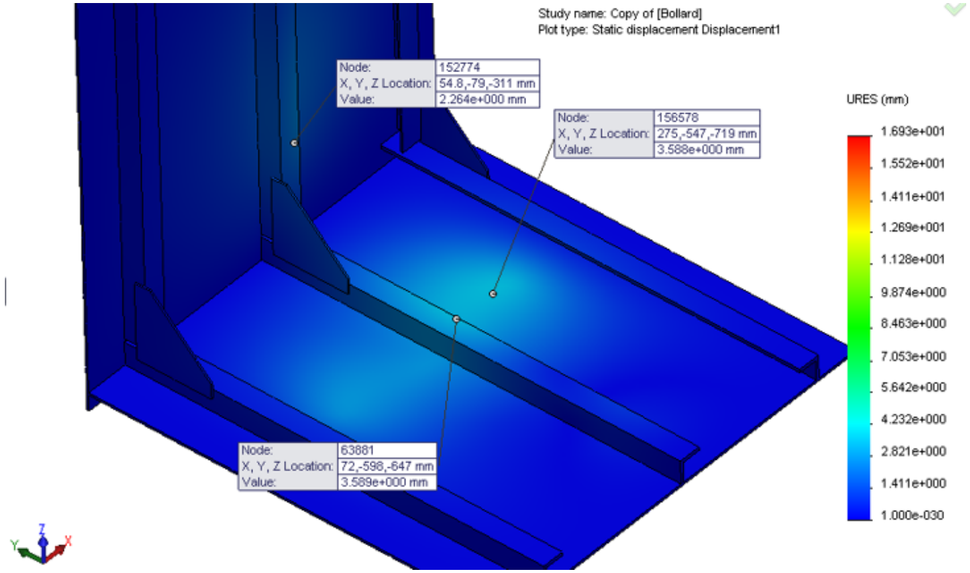


Boundary conditions

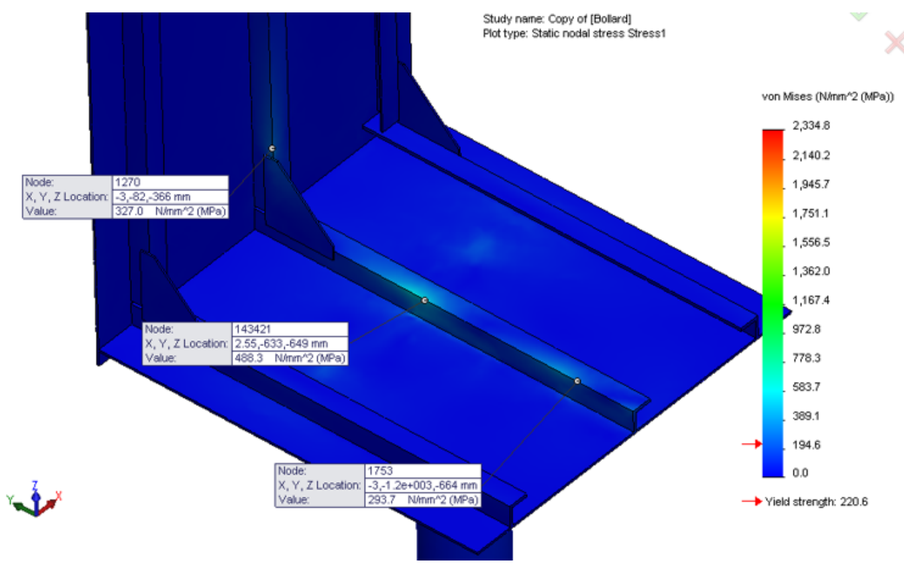
Result Plots

Stress level of 500MPa and displacement of 3.6mm are quite high value as compare with its material strength limitations, its clear evident that there is a possibility of failure of structure for the given load condition.

Alternative design is recommended for withstand the design load. Further slides shows the alternate design and its results.



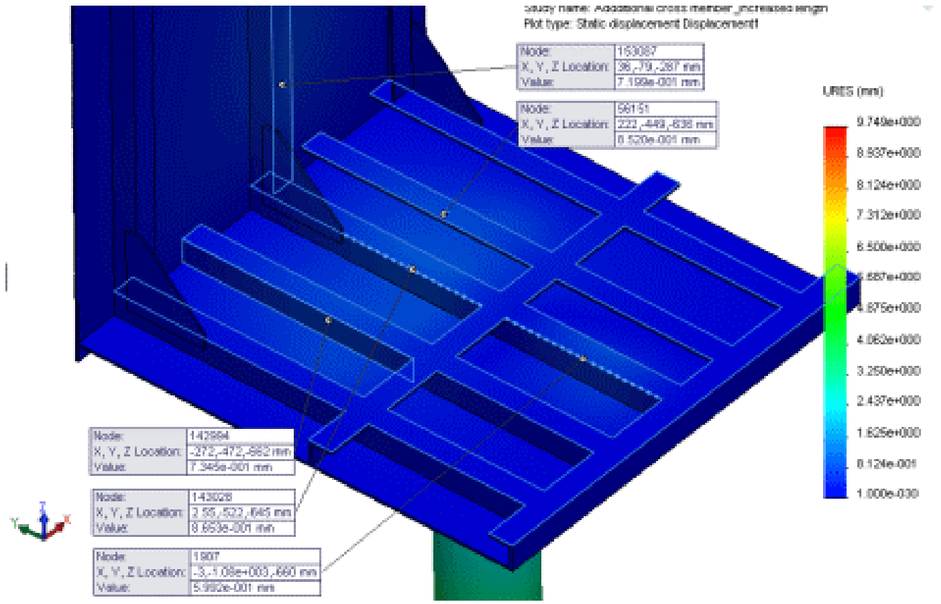
Maximum stress observed in the L’ angles is 500Mpa



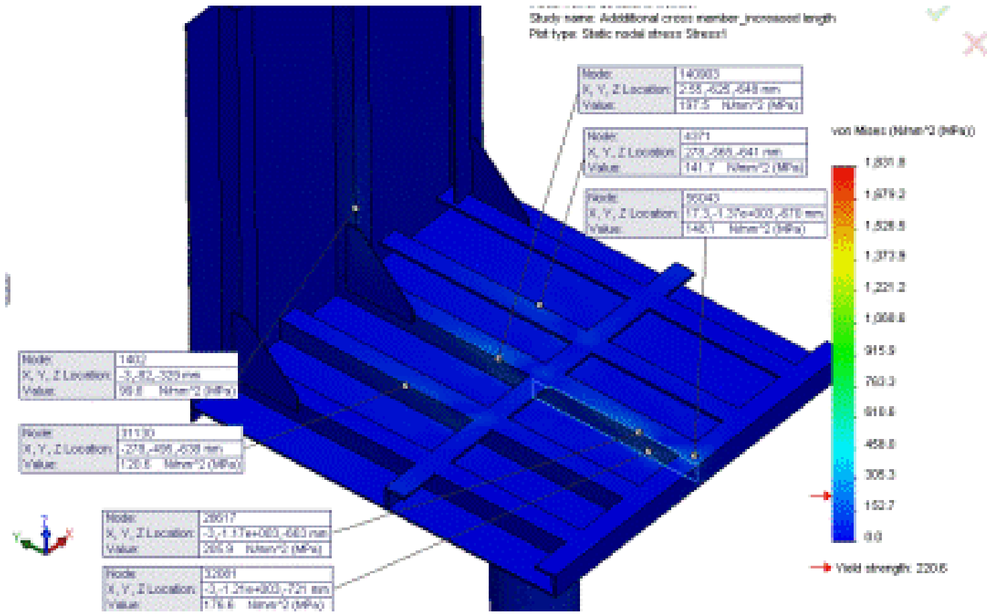
Maximum Displacement observed in the L’ angles 3.6mm

Alternate Design Recommendation

The strength level of newly recommended design structural members are increased by more than 50% compared with the existing design strength.



Maximum stress observed in the L’ angles is ~ 210MPa

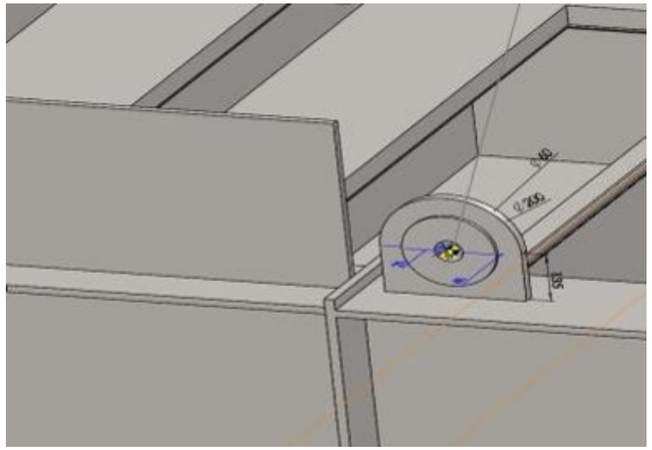


Maximum Displacement observed in the L’ angles is – 0.9 mm

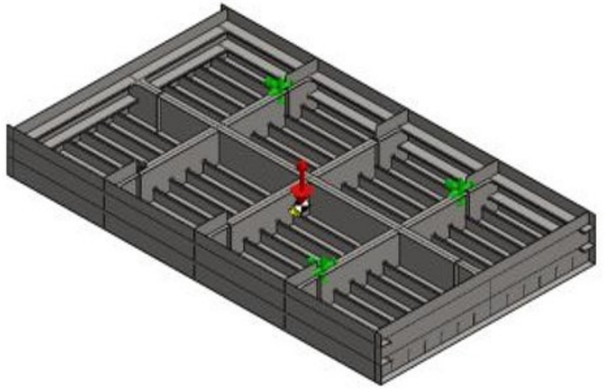
Analysis of Panel U124

Aim:
One panel U124 has to be analyzed by FEA method for stresses and displacement occurring when it is lifted.

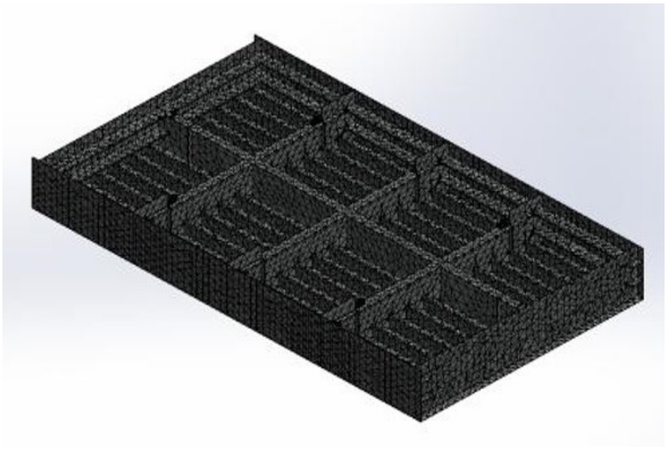
Method of lifting: 4 point method using 1 crane (with spreader)



Pad eye arrangement



Model

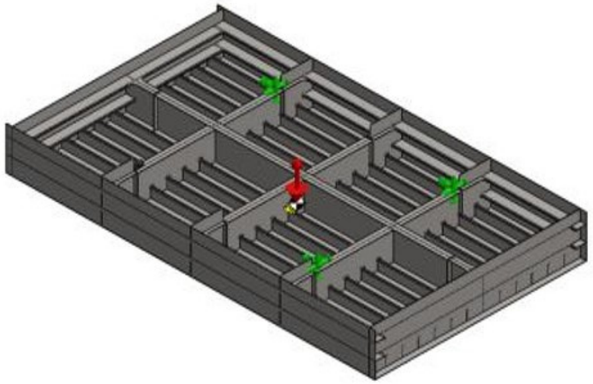


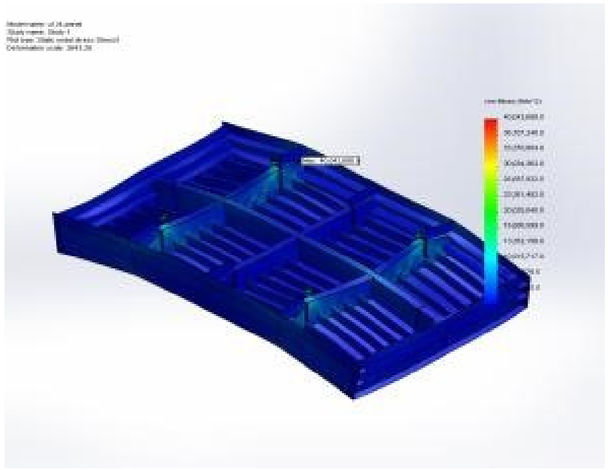
Mesh

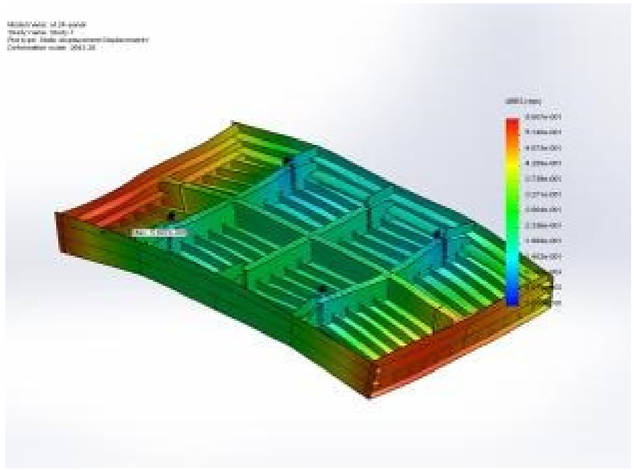
Result Plots

It is seen that the stress is about 40 MPa and considering the load augmentation factor of 1.05, the stress values 42.0 MPa which gives a factor of safety of about 5. The max stresses are in the pad eye and the panel is observed to be stressed even lower and is around 28 MPa. The maximum displacement of the panel is 0.5mm. Considering the displacement with load augmentation factor (with CS Poisson's ratio) the displacement is estimated to be less than 0.6mm.

Thus provisioning of pad eyes as shown is safe for lifting of the panel.





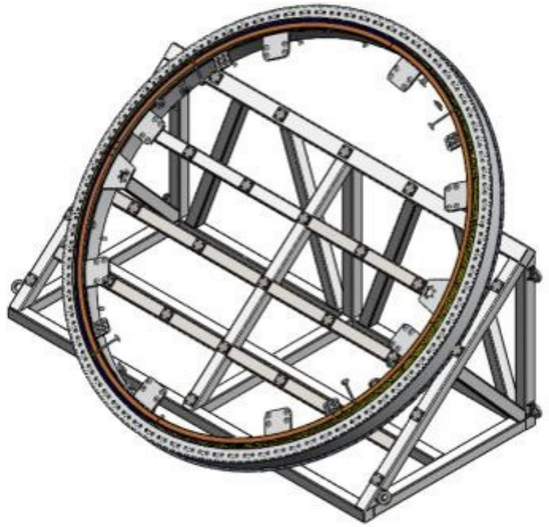


Analysis of Lifting Ring For Ship

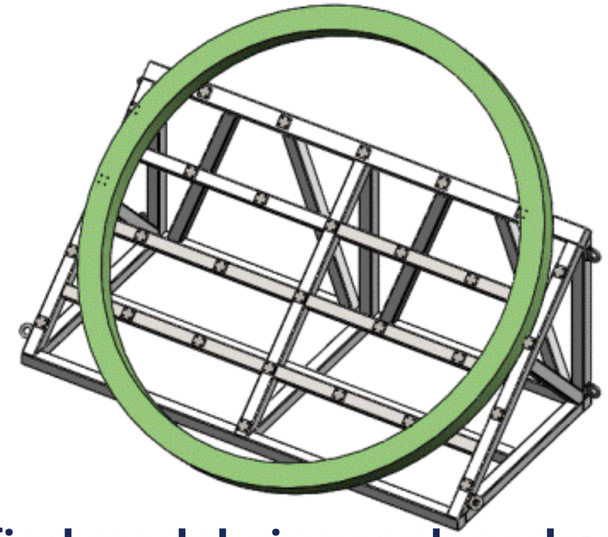
Aim:

1. To analyse the structural strength of universal frame used for transportation of rings mounted on the frame by road transport.

2. To analyze the structural soundness of the lifting eyes attached to the frame to lift the whole structure including the ring for the worst Case scenario



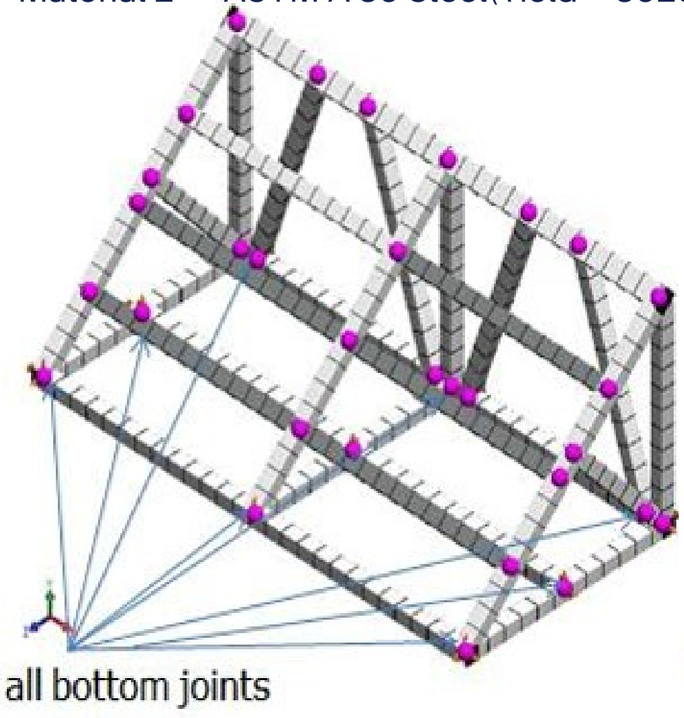
Original model

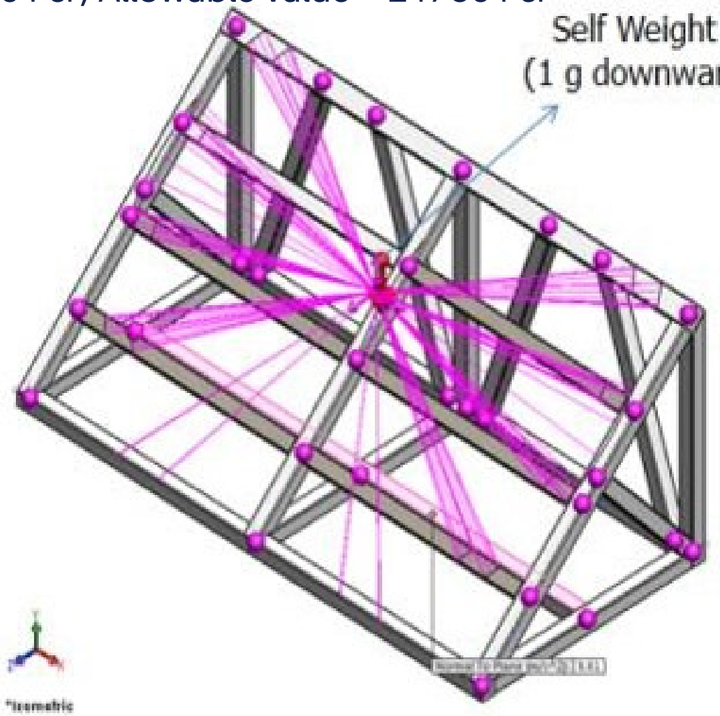


Modified model, ring replaced with another of equal size and weight for analysis only

Mesh & Boundary Conditions- case I

- The analysis carried out only for the worst case 6916 lbs is applied as a remote mass
- The welding between the components considered as fully bonded
- The structure is split over the places where the ring is touching and the load is applied.
- The allowable limit is taken as the 60 % of the yield value of the given material .
- Material1 - ASTM A 500 Grade B (Yield = 46000 Psi , Allowable value = 27600 Psi)
- Material 2 - ASTM A 36 Steel(Yield = 36250 Psi , Allowable value = 21750 Psi

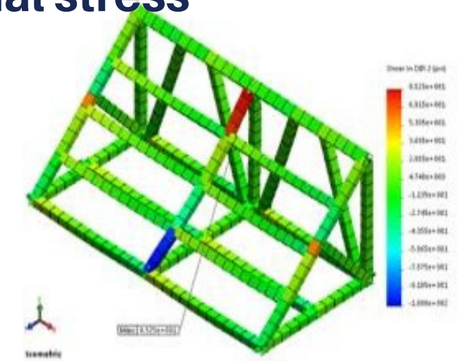




Study name	Static 2-DPG 168 Bowl (-DPG168 BOWL-)
Mesh type	Mixed Mesh
Mesher Used	Curvature based mesh
Jacobian points	4 points
Jacobian check for shell	On
Max Element Size	2.5 mm
Min Element Size	0.833325 mm
Mesh quality	High
Total nodes	1093049
Total elements	710700

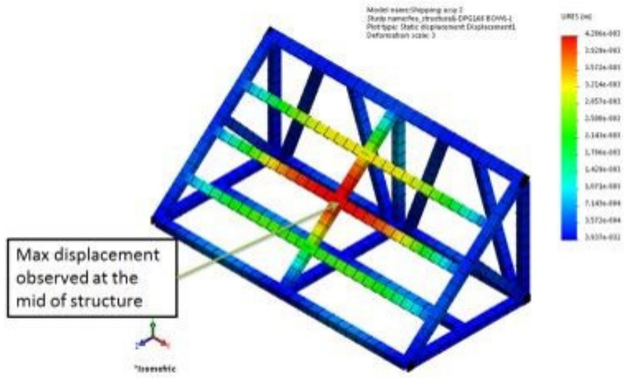
Result Plots

Torsional stress



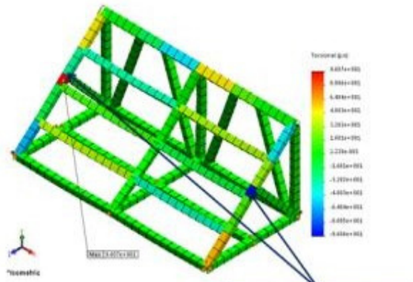
Maximum Stress = 85 Psi

Shear Stress



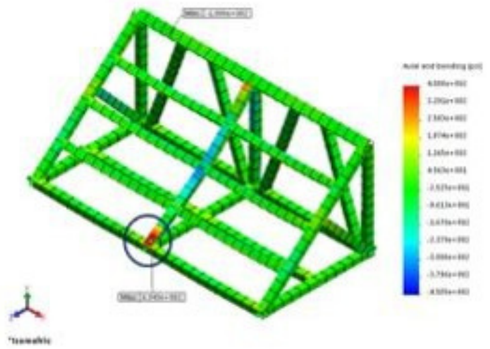
Maximum displacement = 0.0042 inch

Combination of stresses - Axial & Bending stress



Maximum Stress = 96 Psi

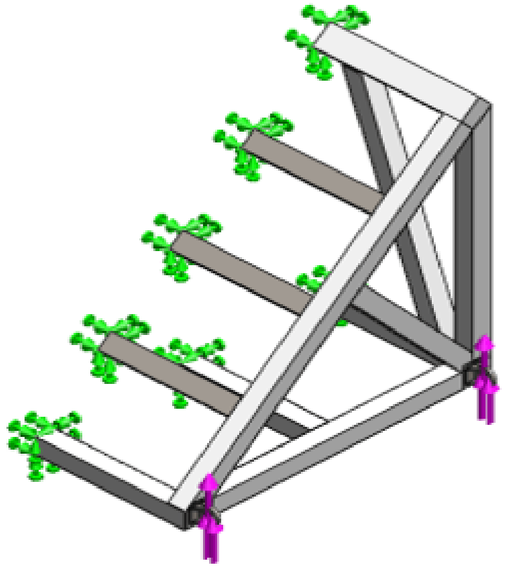
Displacement



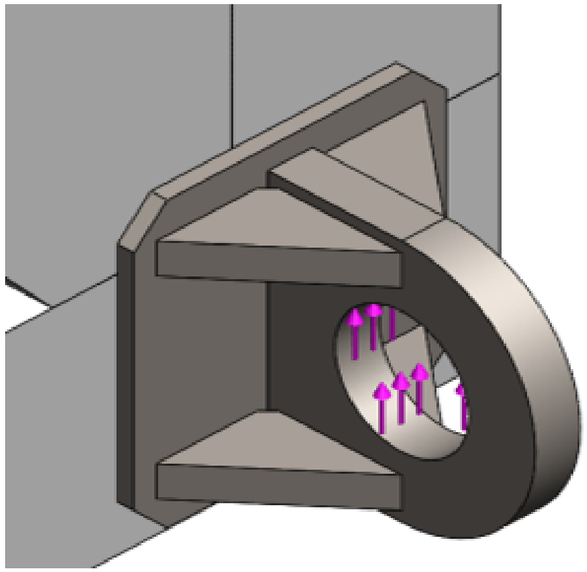
Maximum Stress = 694 Psi

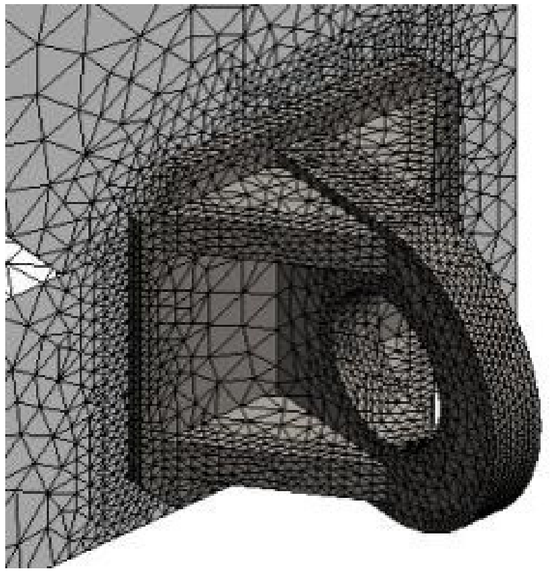
Mesh & Boundary Conditions- case II

- Structure is lifted by using four vertically positioned lifting eyes
- 5000 lbs is assumed to be acting on a single lifting eye
- Materials are isotropic in nature and loading condition is symmetrical



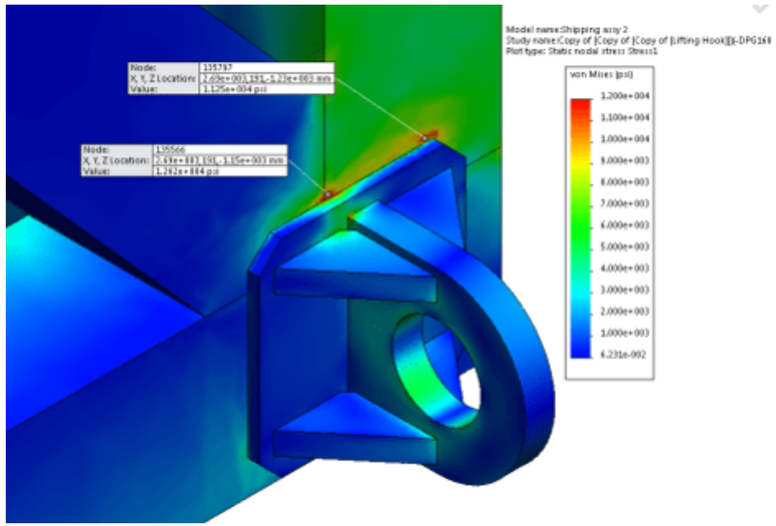
Fix constraints at cross sectional areas





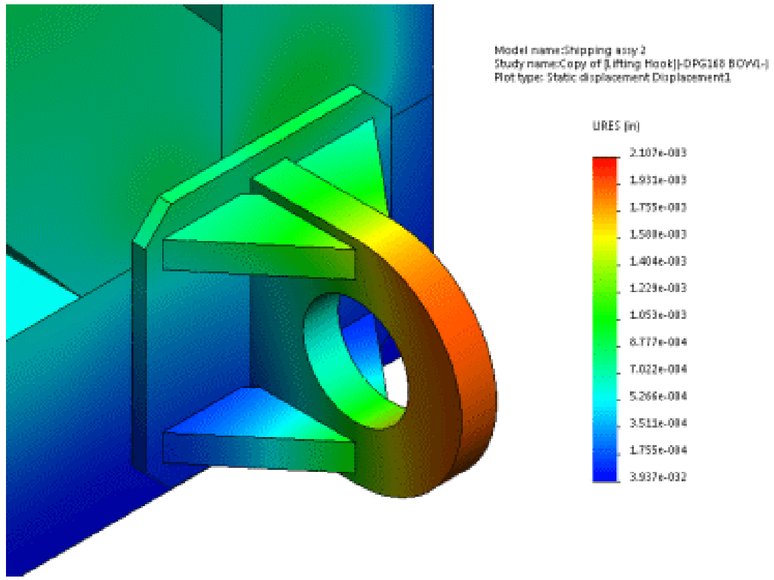
5000 lbs Applied vertically upward

Result Plots



Maximum Stress observed on the lifting Eye = 9250 Psi

Maximum Value of Stress observed at structural member near to the lifting eye= 12620 Psi

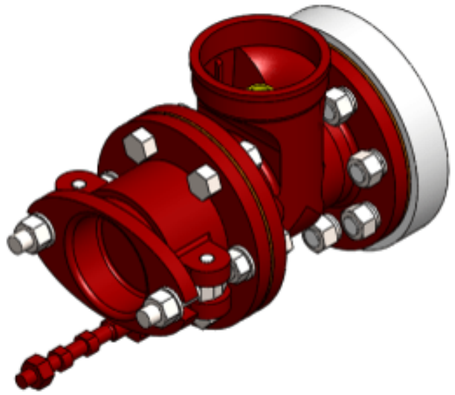


Maximum value of displacement = 0.0021 inch

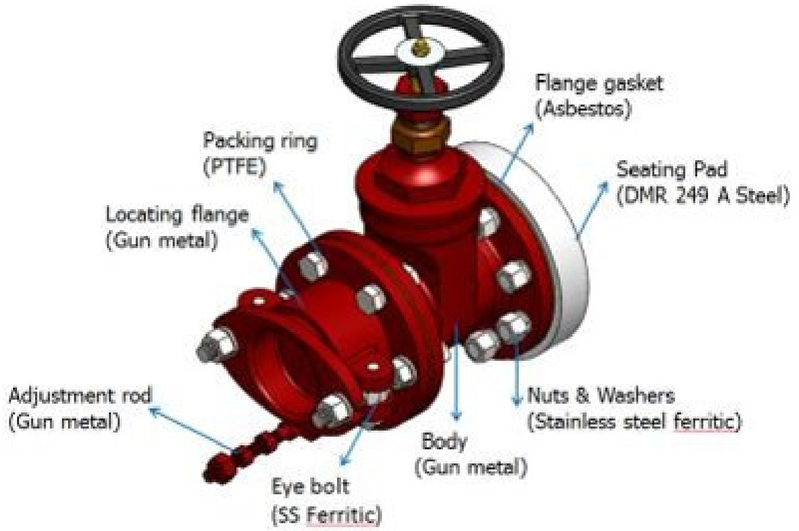
Analysis of Sea Valve

Aim:

To understand the structural stability of the sea valve using FEA analysis technique for following test criteria 2 kgf / cm2 pressure against the valve shutter for 30 minutes.



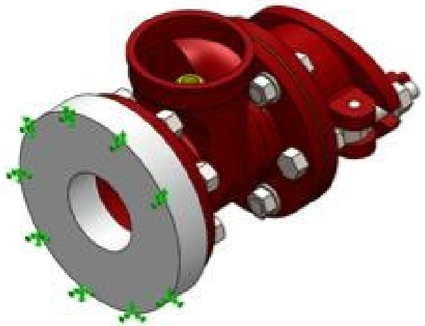
Original model



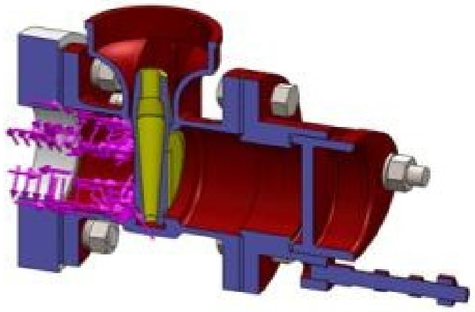
Materials

De featured model for analysis

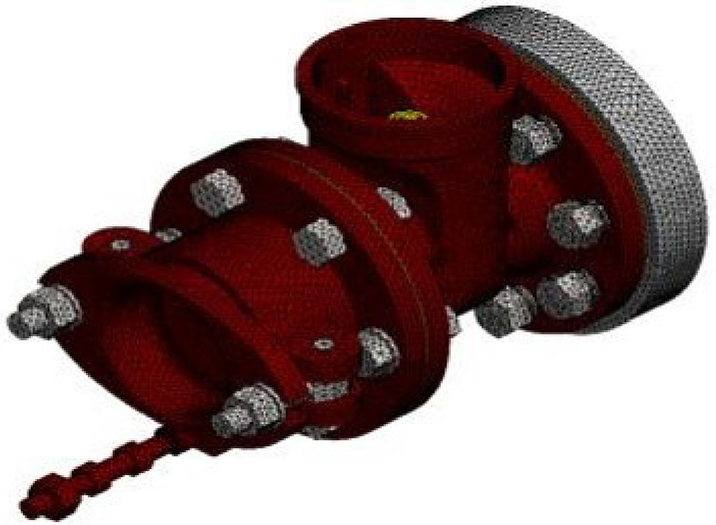
Mesh & Boundary Conditions



Arresting all degrees of freedom at the bottom edge of seating pad

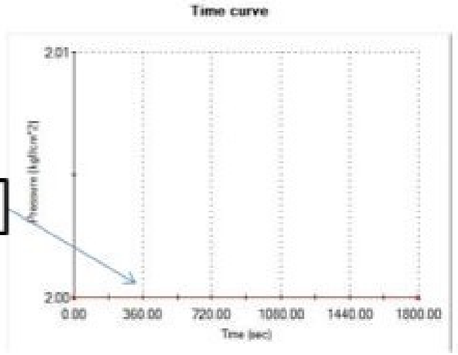


Pressure applied – 2Kgf/cm² for 30 minutes



Boundary condition curve –
Image extracted from software

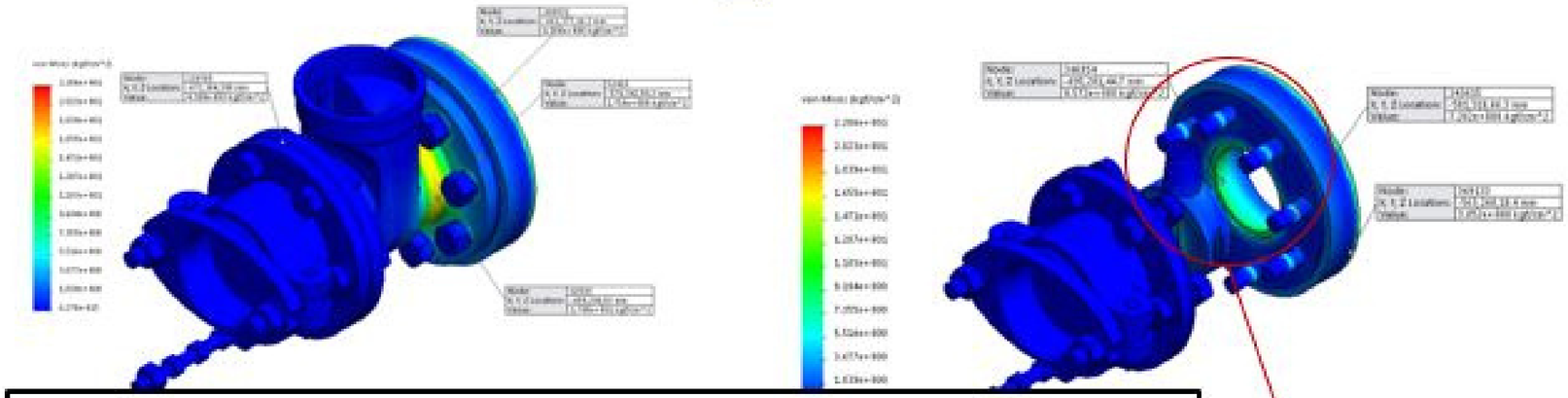
Red line shows the pressure curve Vs Time



Mesh Details

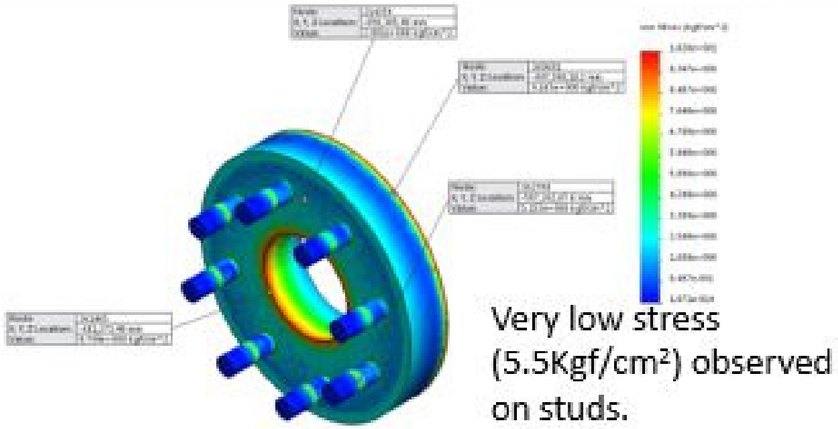
Study name	Nonlinear 1 (-Default-)
Mesh type	Solid Mesh
Mesher Used	Curvature based mesh
Jacobian points	4 points
Max Element Size	5 mm
Min Element Size	1 mm
Mesh quality	High
Total nodes	557201
Total elements	364069
Maximum Aspect Ratio	236.19
Percentage of elements with Aspect Ratio < 3	96
Percentage of elements with Aspect Ratio > 10	0.482
% of distorted elements (Jacobian)	0

Von Mises Stress Plot

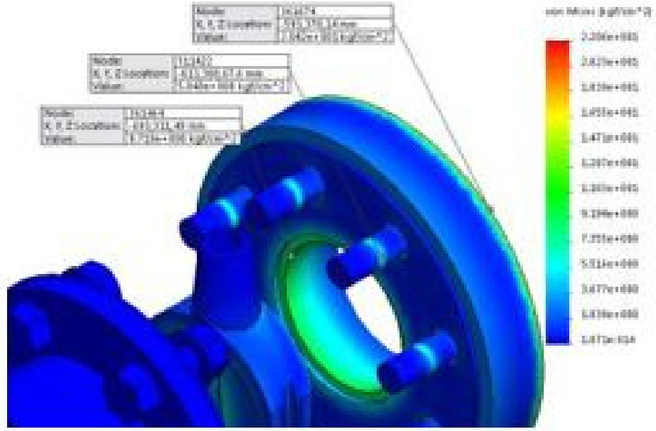


Maximum value of stress observed as 22.06 kgf/cm^2 at Body & seating pad edge. Maximum stress observed is very low compared to the Allowable limit of the DMR 249 A Steel used.

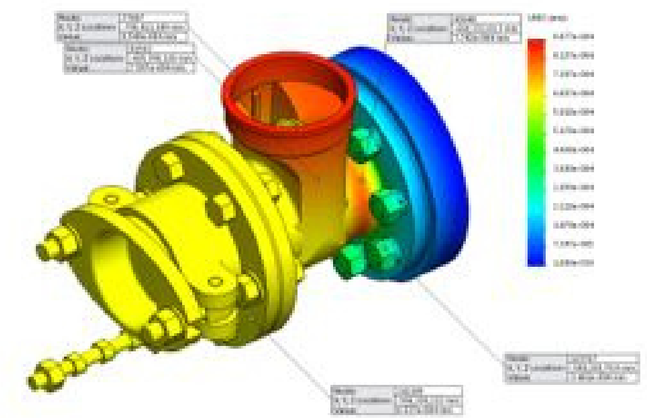
Some parts are hidden in some views for the better understanding

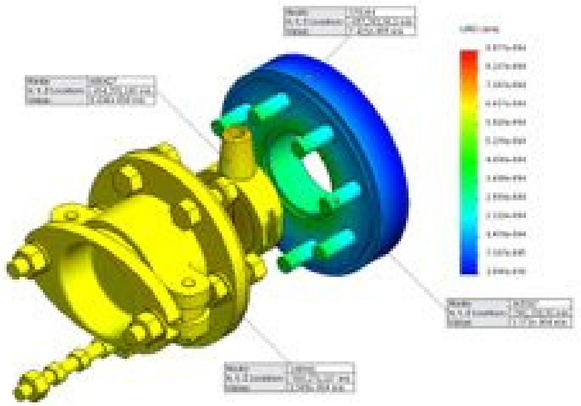


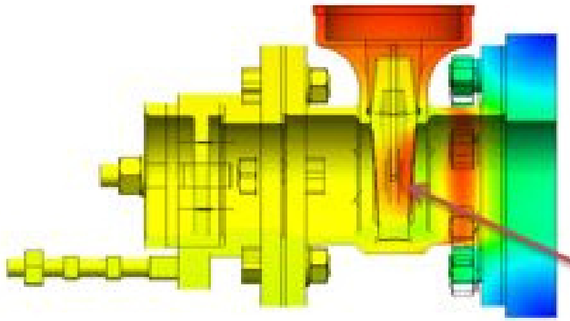
Very low stress (5.5Kgf/cm^2) observed on studs.



Displacement Plot

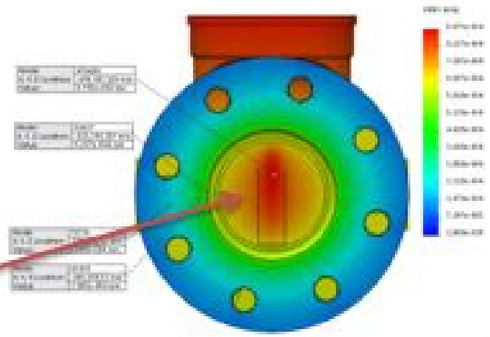






Sectional View

Side View for better understanding of clearance between shutter and body.



Maximum value of displacement= 0.0008877mm (0.9 micron)
Displacement observed between the body and shutter of the valve is 0.0006267mm.i.e.0.62 micron The clearance maintained between them is 0.08 mm, Since the displacement is very low it is opined that the valve remains leak proof under sustained loading.

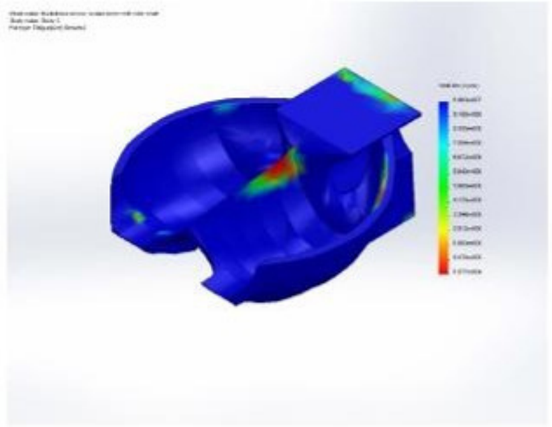
Component Stress Table

Component Name	Material	Yield limit (Kgf/cm^2)	Allowable limit (Kgf/cm^2)	Maximum von mises stress observed (Kgf/cm^2)	Maximum axial stress observed (Kgf/cm^2)	Factor of safety
Seating Pad	DMR 249A STEEL	1764	1058.4	20.5	17.5	51
Flange Gasket	Asbestos	NA	61 (Tensile strength)	6.5	4	9
Body	Gun metal-1	1550	930	22.06	22.86	40
Wedge	Gun metal-2	907.5	544.5	15.68	18.15	30
Spring lock Washer	(SS) Ferritic	1757	1054.2	2.568	1	>100
Plain Washer	(SS) Ferritic	1757	1054.2	16	3.7	66
Nut	(SS) Ferritic	1757	1054.2	1	0.5	>100

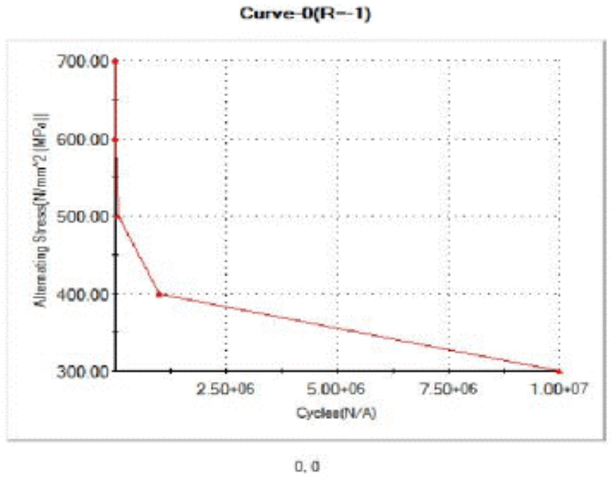
FATIGUE ANALYSIS

Aim:

Life estimation of the Pelton turbine bucket due to cyclic water jet impingement.



Name	Type	Min	Max
Results	Life plot	15765.5 cycle Node: 2545	1e+007 cycle Node: 2

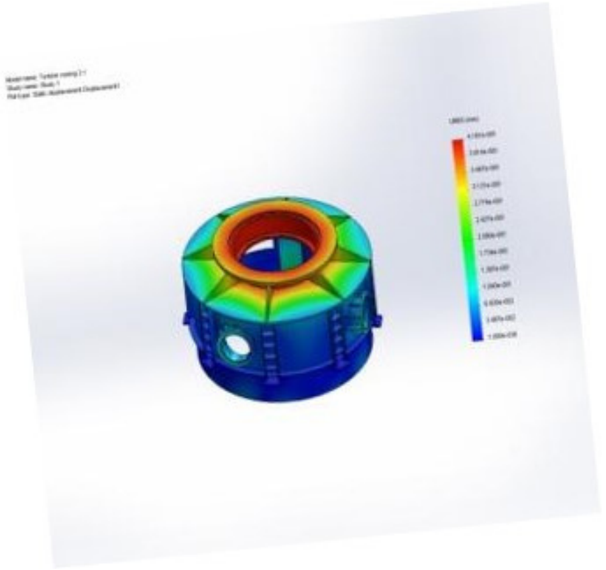


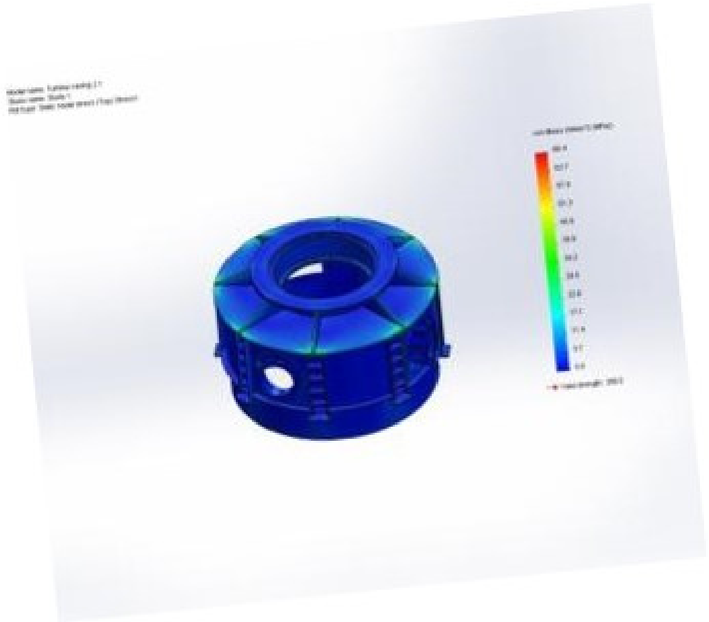
ENDURANCE STRESS FOR:
10^6 Cycles- 400 MPa & 10^7 Cycles – 300 MPa

Approach: Good man diagram technique

Analyzed stress is 200MPa, according to the SN curve 2 x 106 cycles for 300 MPa, confirmed the part is safe for intended life

Covenant Standards: Publications and ASTM





4. Vertical Vacuum Furnace

Structural Strength of Turbine Casing

Client : Hydro Power sector

Scope of work: To analyse the given structure to bear the operating loads [Shaft and generator assembly seated at top of housing -16000 Kgf]

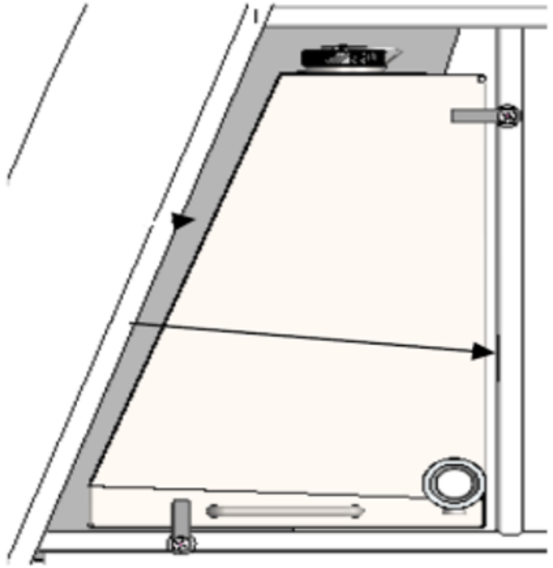
Input: Component drawing & GA drawings Material Properties and other data

Delivery: Analysed stress developed and the displacement. Compared with GES. Recommended additional stiffeners, revised stress and displacement and engineering drawings.

Covenant Standards: IS 800:2007 & GES

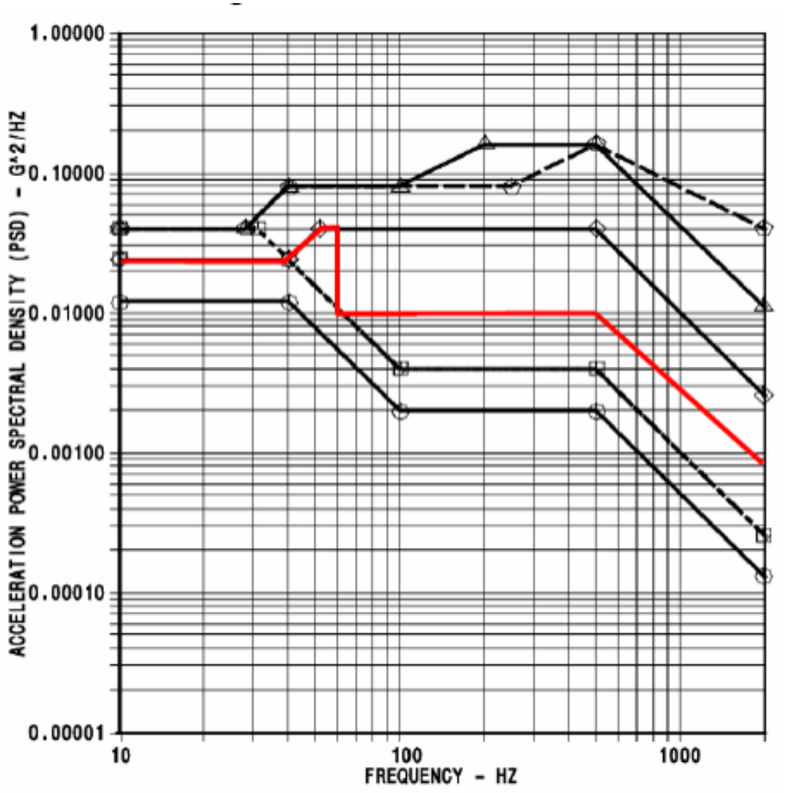
Aviation Structure Analysis

This report substantiates the structural stability of 15 Liter potable water tank fabricated as per drawing Drawing No. DA1451022-103. This tank is fabricated with stainless steel material 316 L grade and all welds are to AWS D 17.1, Class C standards. This tank is positioned as shown below



The tank is held in position by quarter turn latch and the remaining annular space packed with and polyurethane foam to ensure tight fit. In order to validate structural stability Finite Element Analysis using CAD tool Solidworks 2014 Premium was used and the tank was modeled and subjected to simulation as per critical loading condition

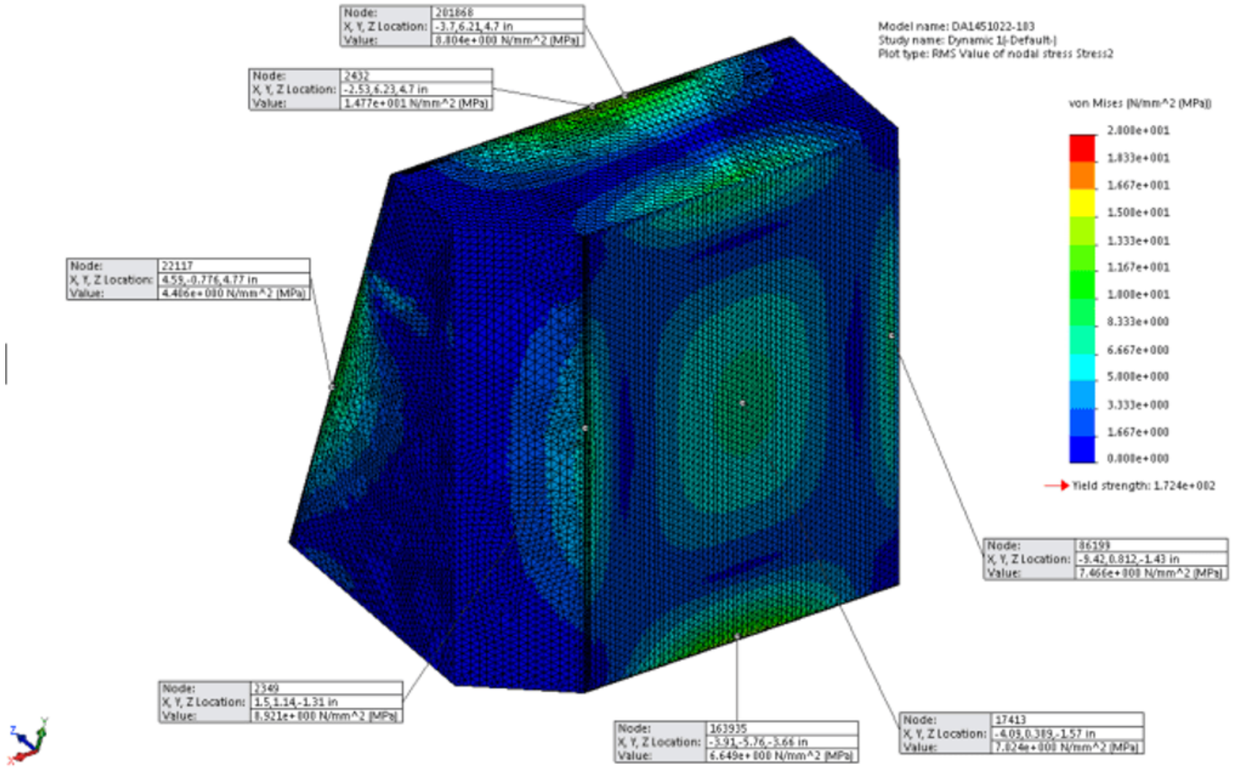
Aviation Structure Analysis



Loading curve as per FAR

Aviation Structure Analysis

3.1.1 Excitation: Side by side – Stress Plot



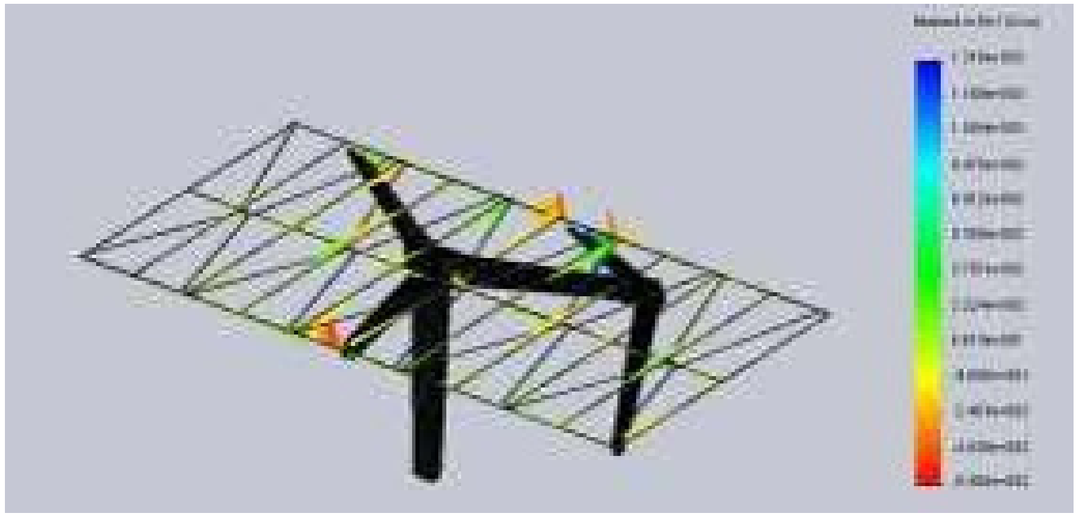
Aviation Structure Analysis

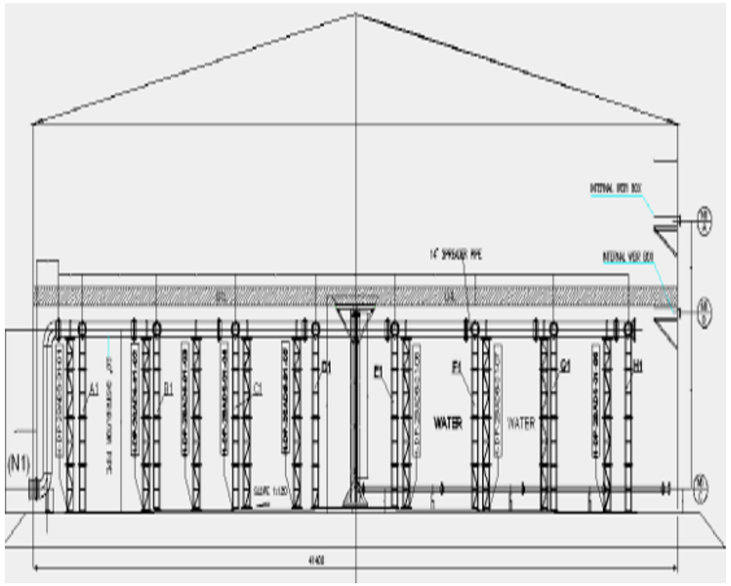
SL.No	Load direction	Stress MPa		Displacement 'mm'
		Avg	Welds	
1	Side by Side	20	20	0.9
2	Forward & aft	20	1.5	0.12
3	Up & Down	10	5	0.18
Allowable stress as per 14 CFR FAR Part 25 Factor of Safety 1.5		Yield stress172 MPa & Hence allowable 114 MPa		
Cyclic Stress value for infinite life 10^7 cycles		140 MPa as per SN Curve Acceptance criteria- Minimum of the two 114 MPa		
Weld joints		Acceptance limit 50% of allowable value 57 Mpa		

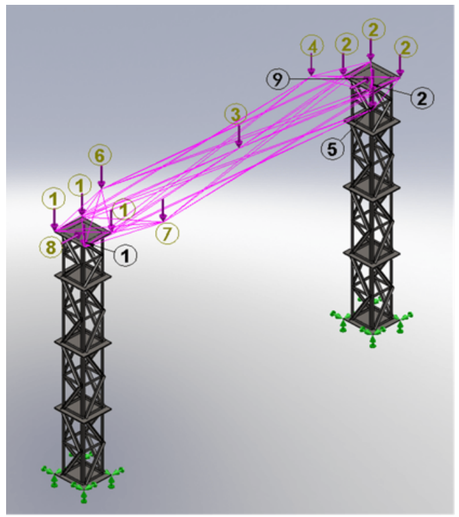
Car Port Design

U.K based product development firm engaged Conceptia to carry out the design and development of Aesthetically appealing Car parking space with solar panels on top.

The structural members were designed using advanced FEM techniques and the client appreciated our design.







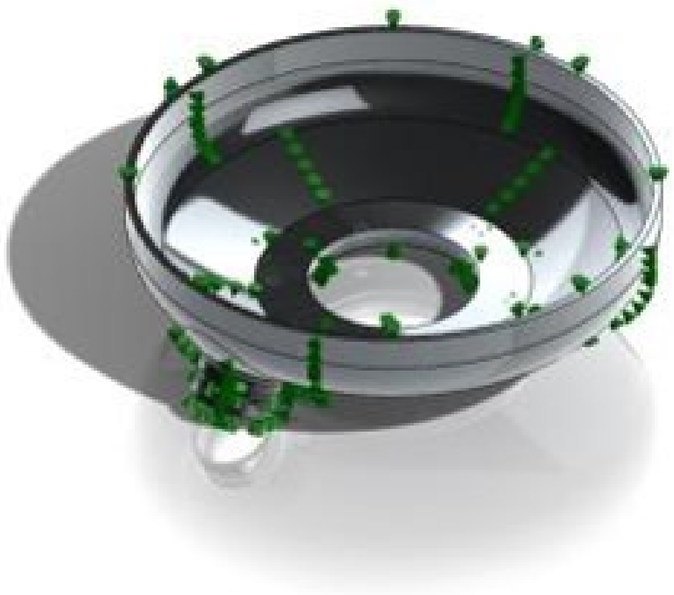
DESIGN & ANALYSIS As Per API Stds

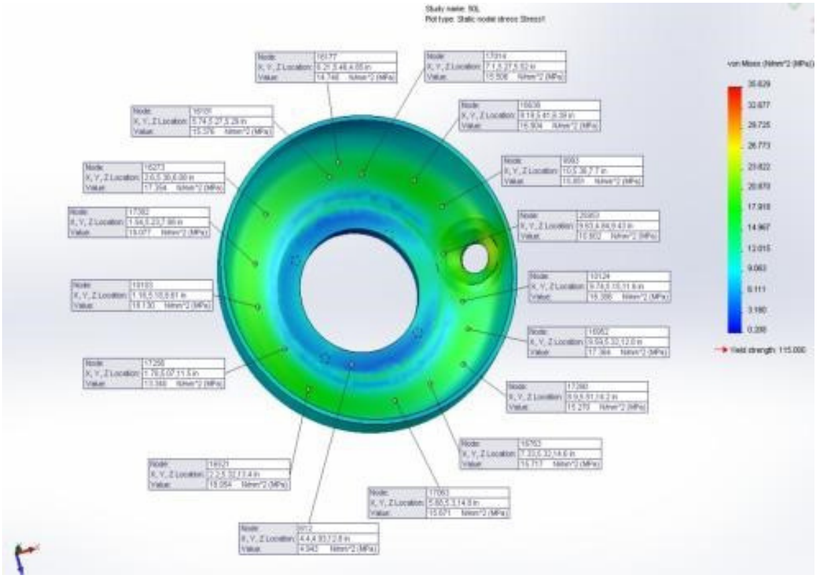
Design and Detailing of Oil spreader line and skimmer line in effluent water balance tank for an Oil Company in Middle East.

Scope of Work

1.Design the distributor and Fixed skimmer collection piping and their supports & slot holes to uniformly distribute effluent water into entire water balance tank.

2.Pipe sizing and hydraulic calculations.





ASME BASED Analysis

Project Requirement

Thermal induced at 1500 C plus mechanical loads applied (weight, Centrifugal force & openings leading to stress concentrations.

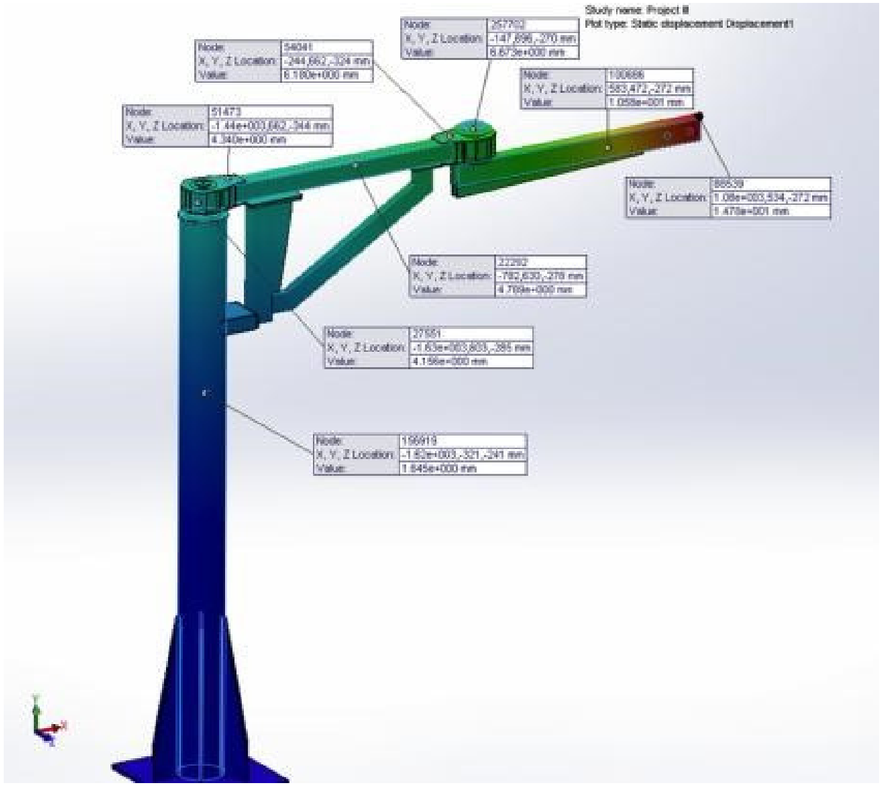
Output: Stress and displacement analysis and acceptance criteria as per ASME Section 8 Div 2.

Redesign & Manufacturing (sample-2 Projects)

Articulating Arm

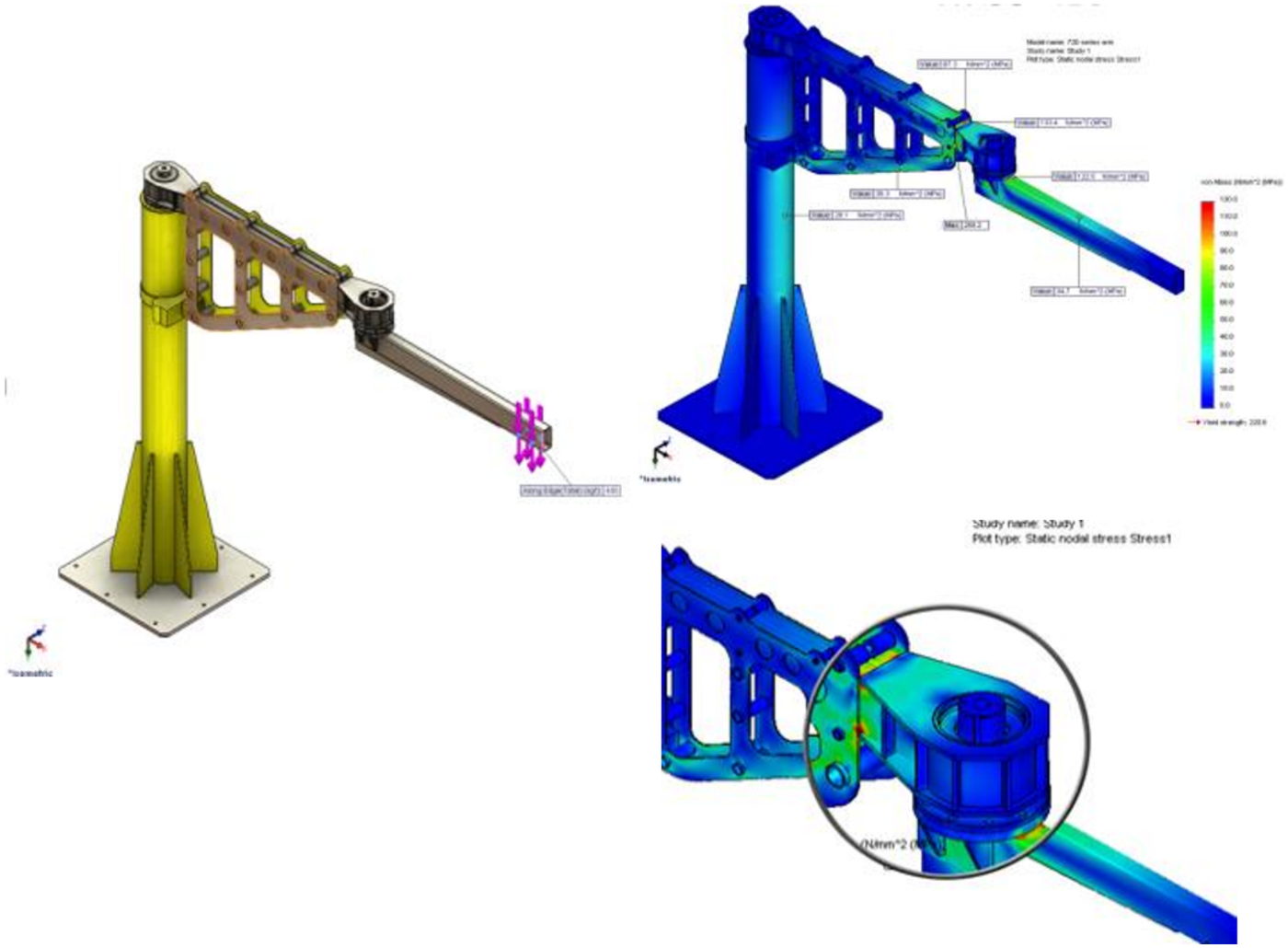
Insitu up-gradation of crane to handle 450 kg weight from existing 100kg handling weight.

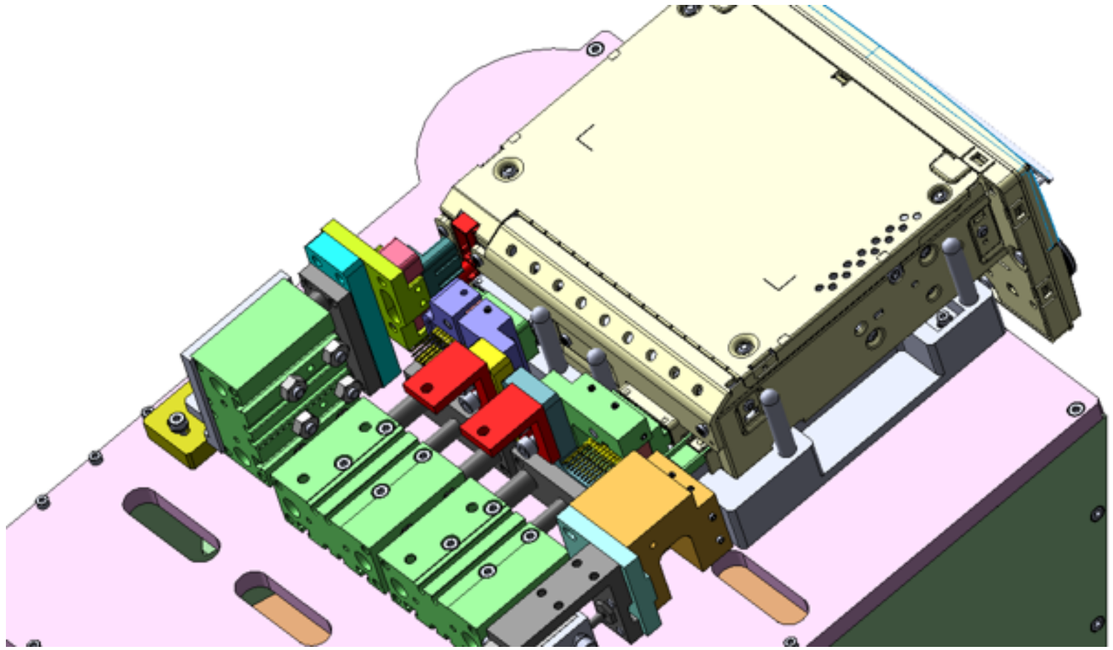
Existing Model

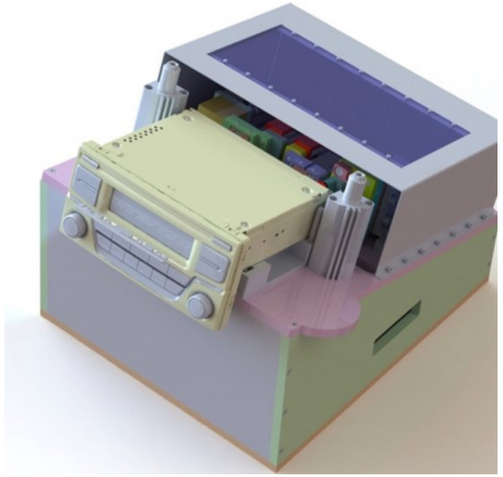


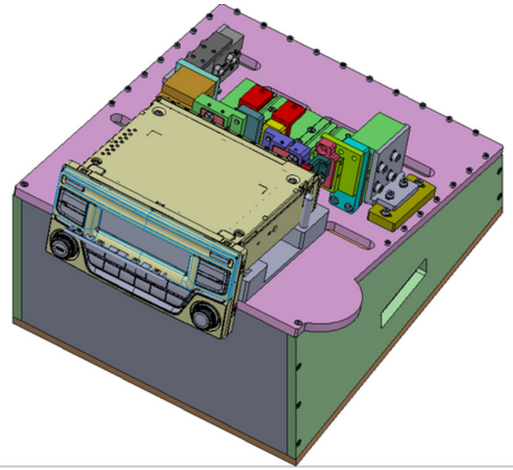
Proposed Model

Articulating Arm









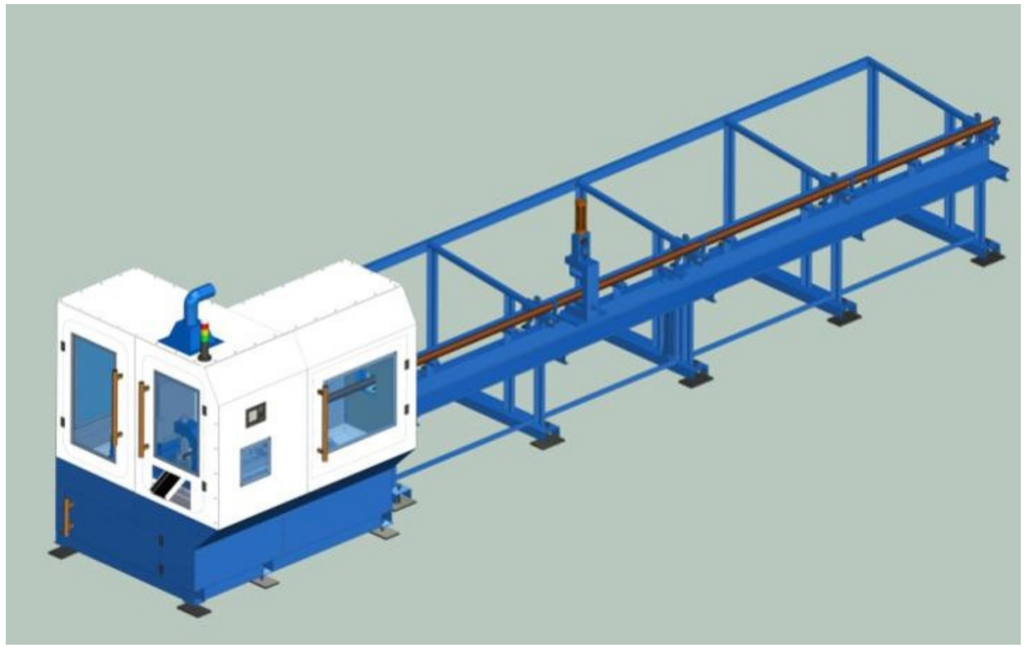
Fixture Design

Design improvements to Electronic Module Fixture for the testing of Audio Systems.

- Conceptia redesigned the fixture by way of
- Insert the test piece on plug and test concept
- Continuous operation of test rig by providing adequate heat dissipation by providing the fans
- Improvements to ergonomics and aesthetics

Customer Support

Cold Saw Machine



AIM:

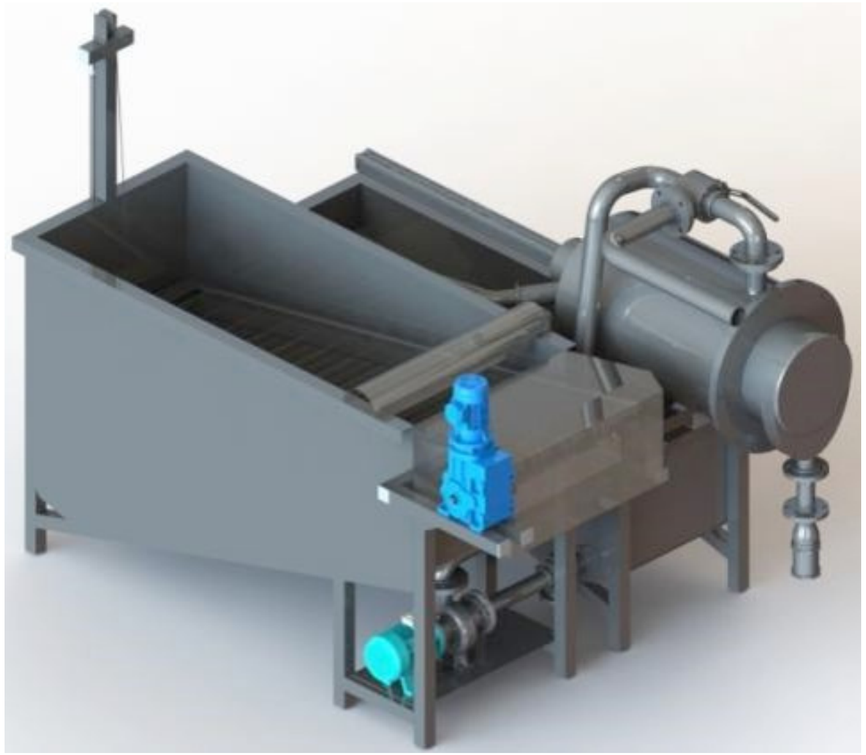
To create an aesthetically appealing design of the cold saw machine and sophisticated rendered images for brochure, extract manufacturing drawings of the same.

Main Features of Assembly

1.Rod feeder
2.Rod Aligner
3.Feeder to the cutter
4.Cutter assembly
5.Electrical & PLC panels

Waste Water Strainer

- Conceptual design& development of waste water strainer.
- To carry out ASME based Stress analysis to assess the strength of filter.
- Rendering to improve marketing



Customer Support Defect Analysis

Failure Analysis

Industries facie challenges in identifying the root cause of in service failure of equipment.

The unexpected failure leads to production loss and repairing time and cost. The reasons can be varied starting from design deficiency, manufacturing inaccuracies, incorrect installation, wrong operations and over exploitation

We at Conceptia support our customers facing these sort of issues and support in identifying the root cause and recommend corrective and preventive action.

Towards this we carry out in depth analysis by a judicious audit and use FE

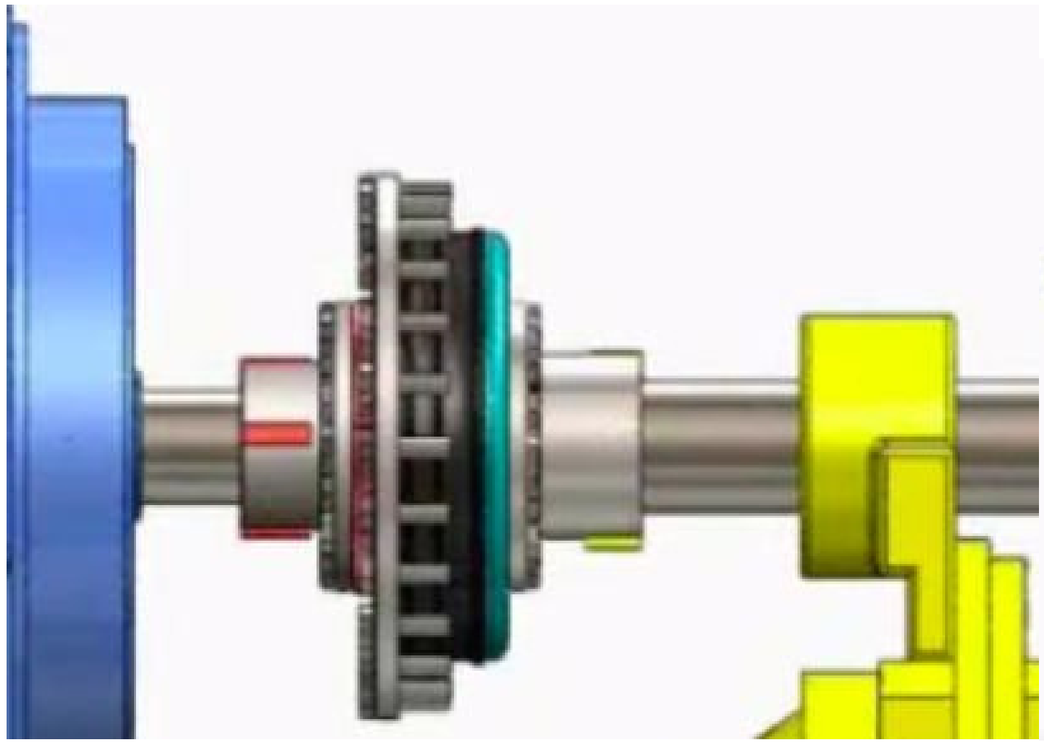
and FE analysis and event depiction to demonstrate the likely sequence of events leading to a failure.

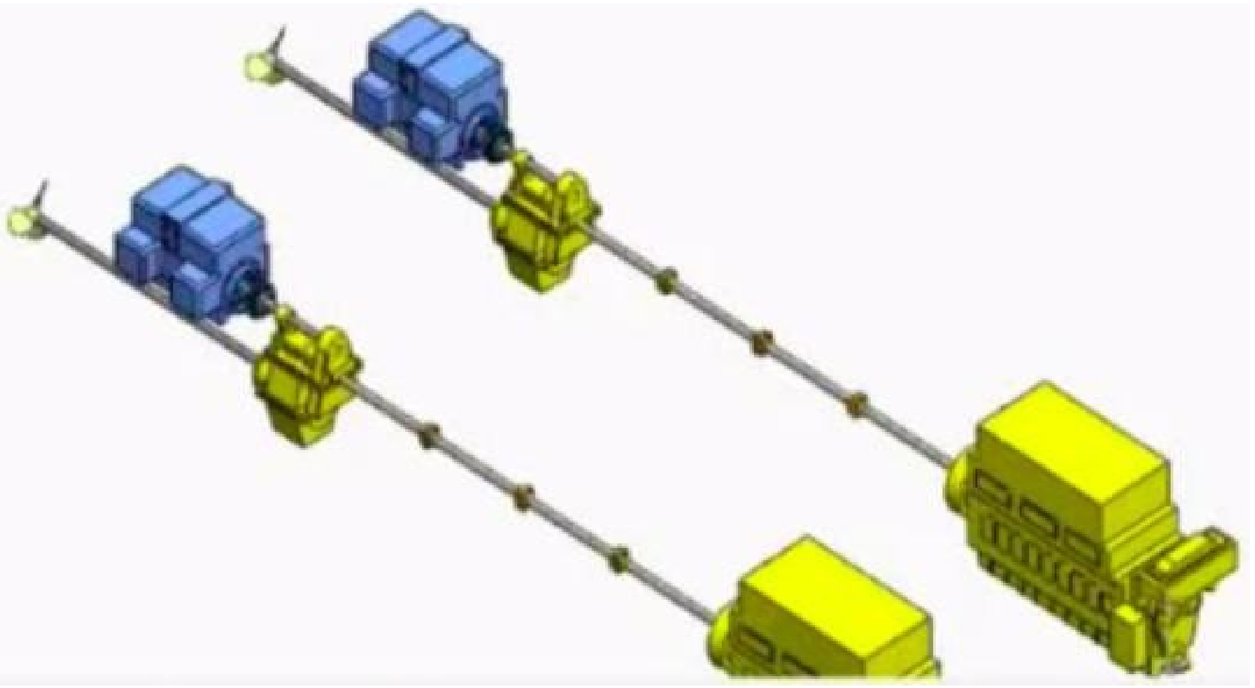
A few such case studies are presented in further slides...

Event Depiction - Failure Analysis

One of the merchant ship suffered a Gear Box damage. The yard requested us to recreate the scene for the purposes of insurance.

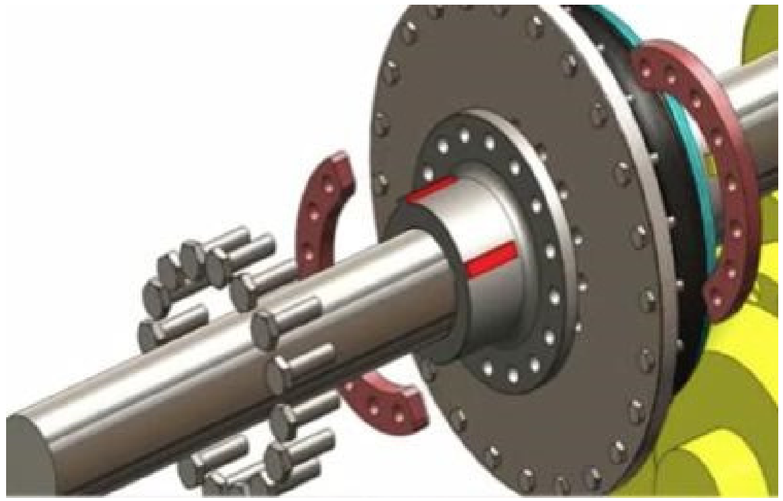
Conceptia engineers went on board, studied the documents and forensic evidence and recreated the sequence.

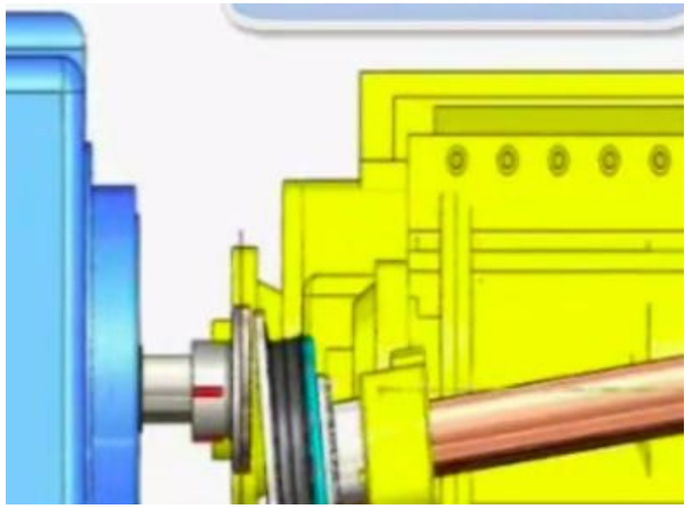




Event Depiction - Failure Analysis

The prescribed assembly sequence. Error leading to GB breaking

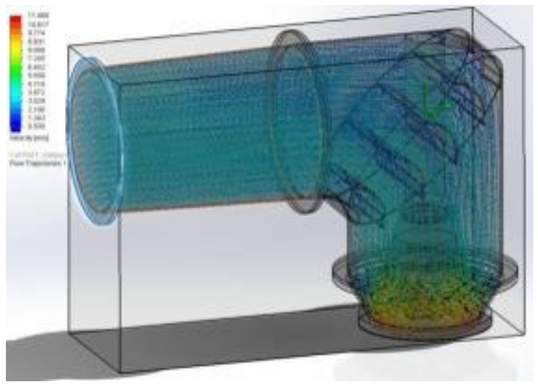


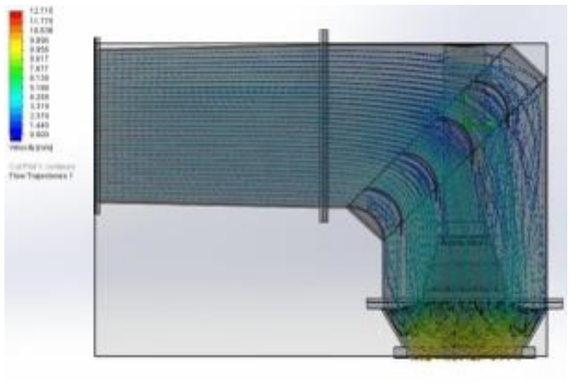


Defect Analysis Turbine Bearing Failure

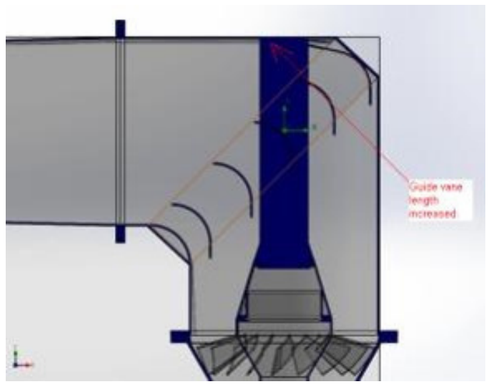
Bearing Life Improvement:

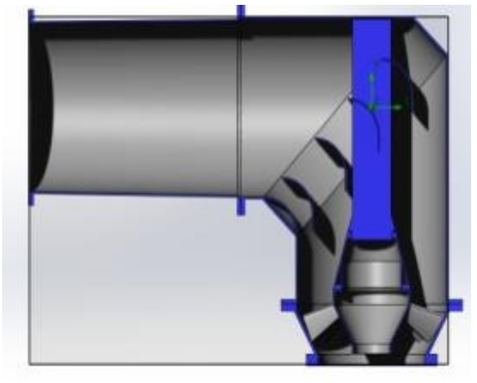
One of the hydraulic turbines was facing premature bearing failure. CFD analysis was taken up and study revealed uneven flow resulted in side thrust which was not envisaged. Correction by way of providing additional guide vanes has resulted in non stop operation since last 2 years





DUCT ASSEMBLY1.0





DUCT ASSEMBLY2.2 [Final Iteration]

Failure Analysis – Filter body

The proven part namely filter body has shown rupture of sheet metal near to the flange.

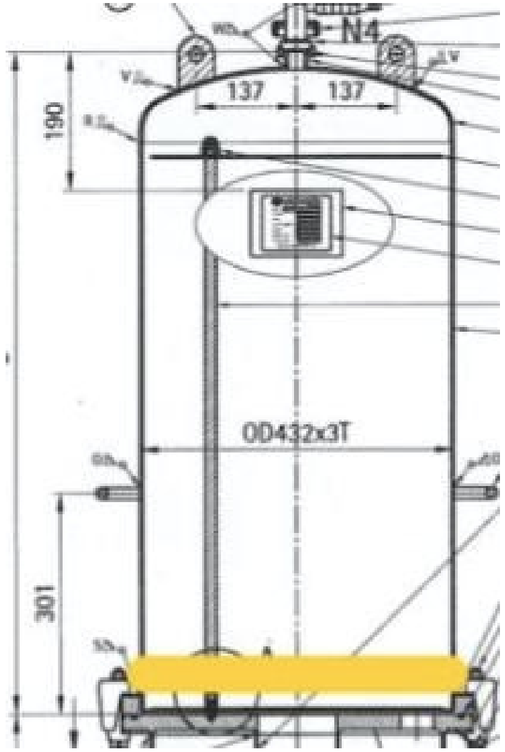
The Firm approached Conceptia to carry out an analysis to identify the root cause so as to preclude such recurrence in future supplies.

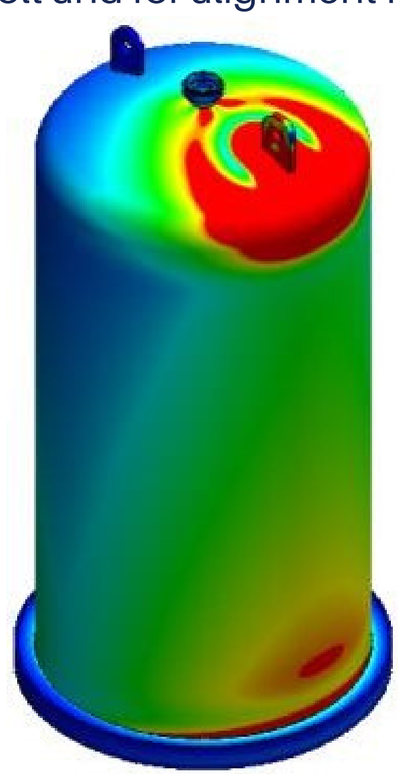
Failure Analysis – Filter body

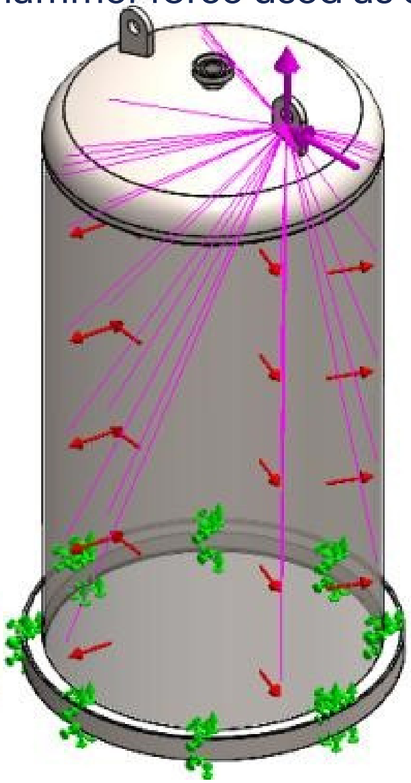
Arrived possible operation loads and impact load at installation and FE analysis carried out to check the stress and failure region of equipment.

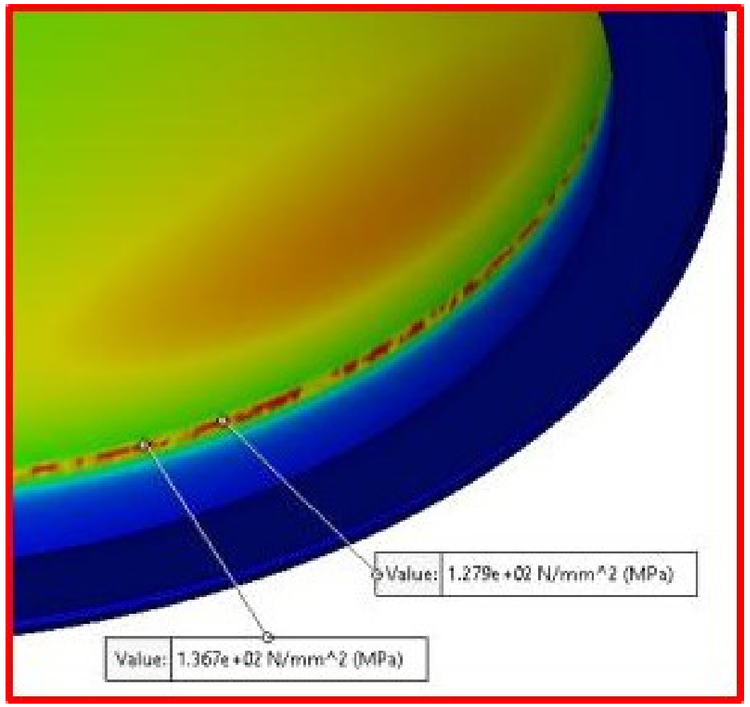
The physical crack location of filter is match with the FE analysis stress concentration region as shown.

Weight of filter taken on single eye bolt and for alignment hammer force used as evidenced by damage to lifting eye.





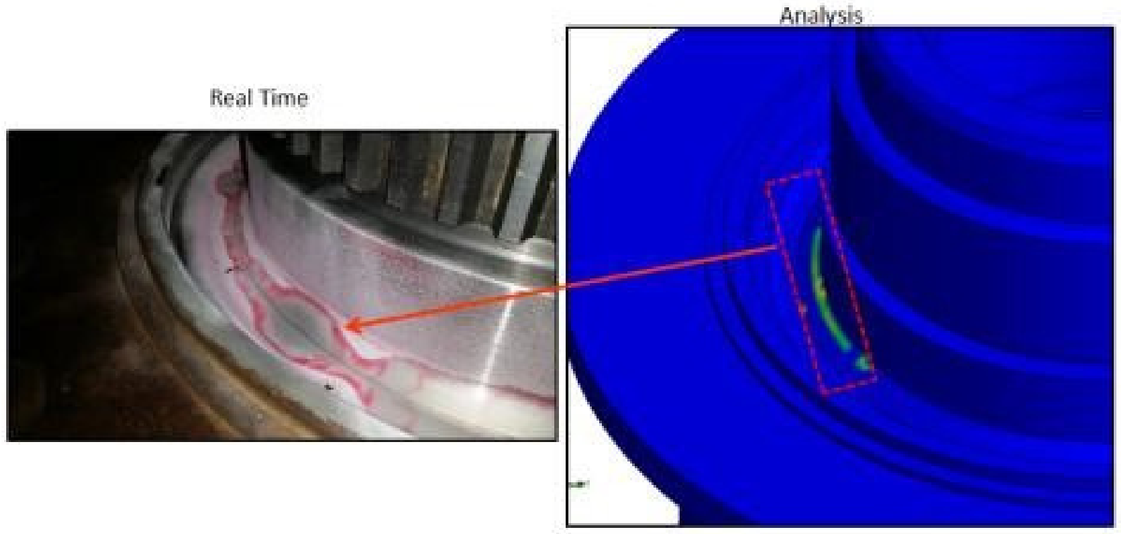


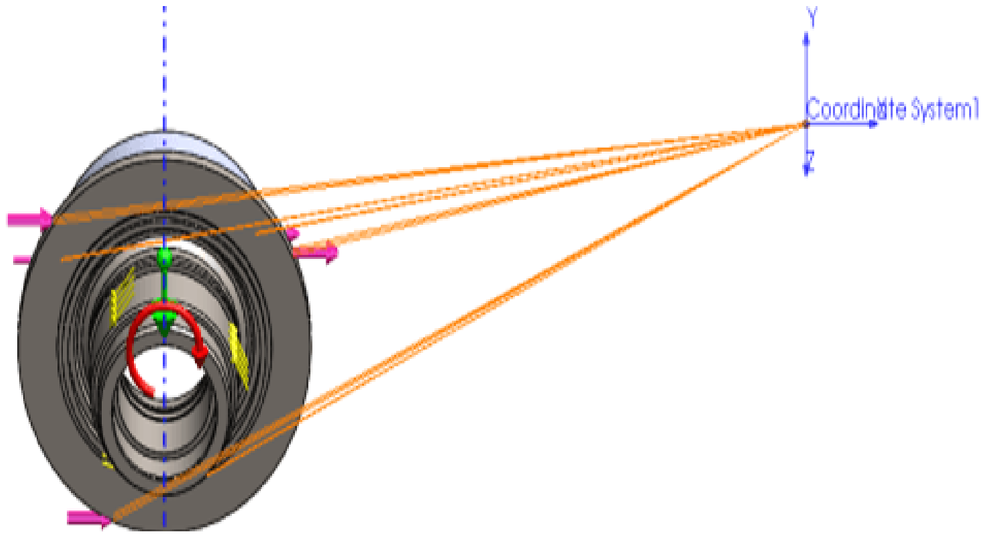


Failure Analysis - Wheel Railway Hub Body

Hairline crack at the wagon wheel hub is the failure observed by customer. This is found to be a premature failure and wanted us to analyse the root cause of this failure.
Load carried by wheel hub is about 35T, assessed fatigue failure is the common cause. Fatigue analysis is carried out to understand the fatigue life and crack initiation location.

Various possible loads such as dead load, braking and accelerating forces and centrifugal forces during rolling over a curved track. Acceleration with dead load has been considered as the worst case scenario where all the forces are presumed to be acting simultaneously.

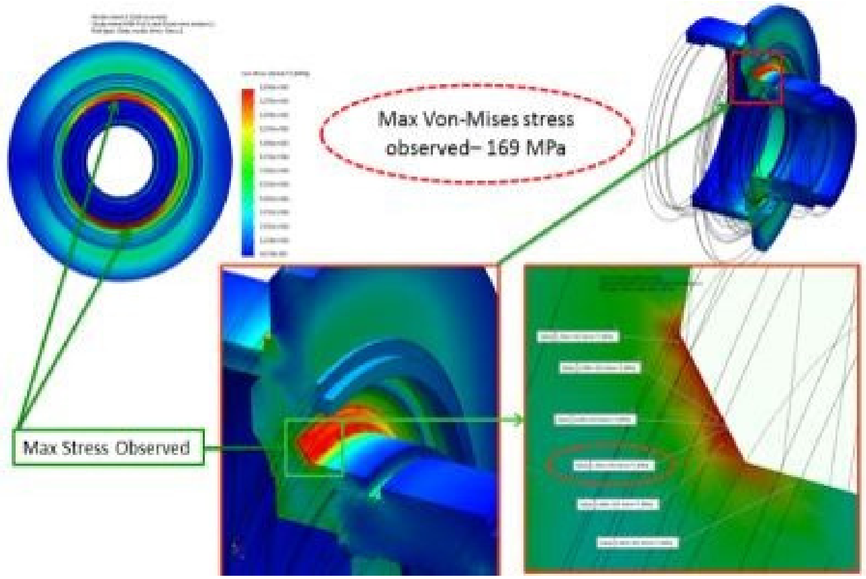


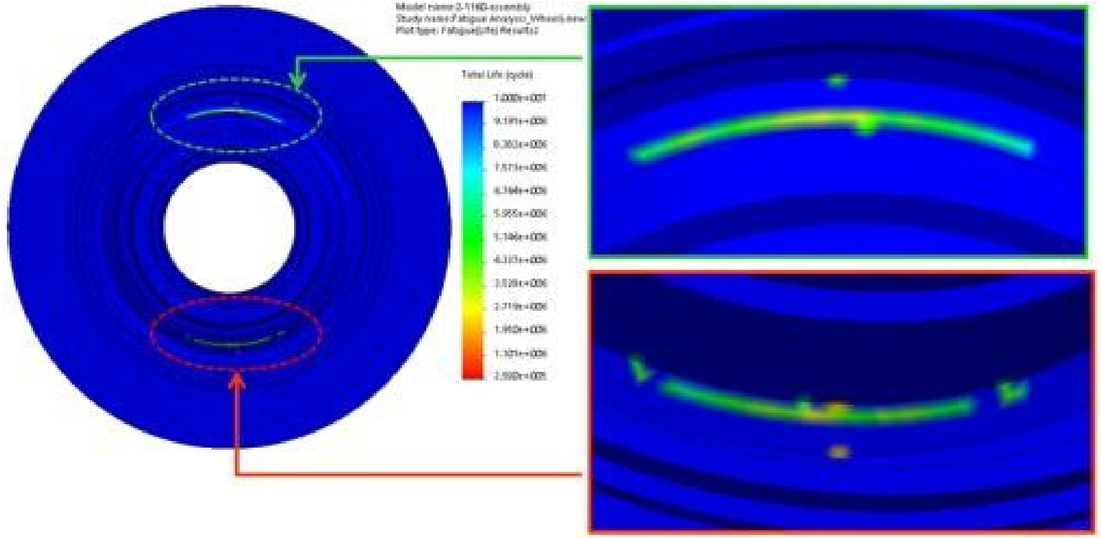


Failure Analysis - Wheel Hub body

The stress value observed very high at the location where crack noticed due to combination load applied on the wheel hub.

Failure cause & location as analyzed and that of the image of real time. It is amply evident that wagon wheel needs to be strengthened to handle 35 T load.

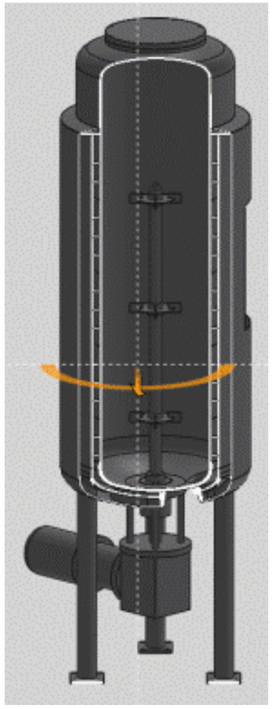




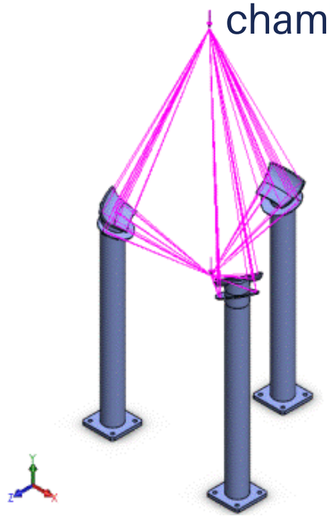
Failure of 1000L Pressure Vessel- Seismic Reasons

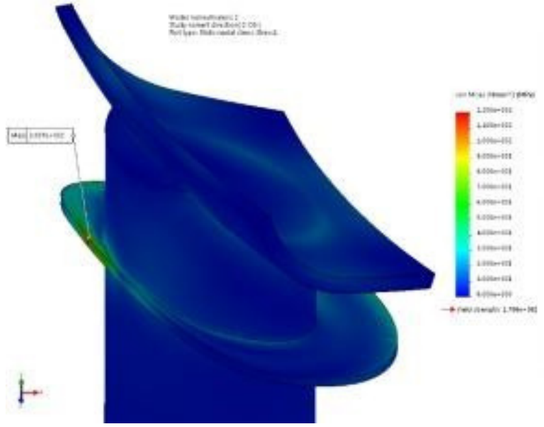
Failure/opening in the cladding plate where the vessel is supported with leg. This equipment is installed in North Korea, suspected the failure is due to seismic condition.

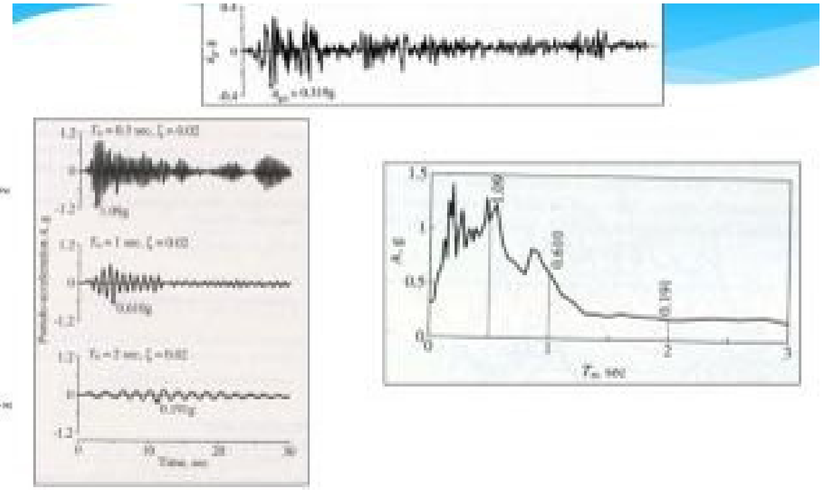
The root cause of this failure study is carried out by conceptia and found the reason for this cause through FE analysis – seismic study approach.



Remote Load 2815Kg applied at CG point of chamber jacket assy.

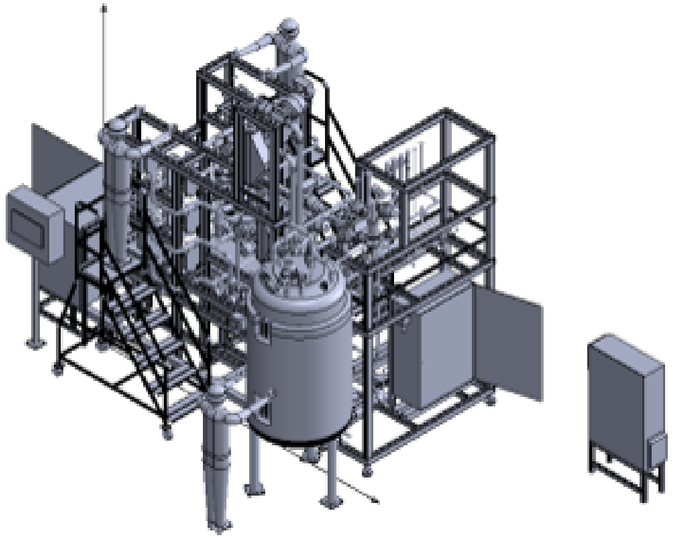


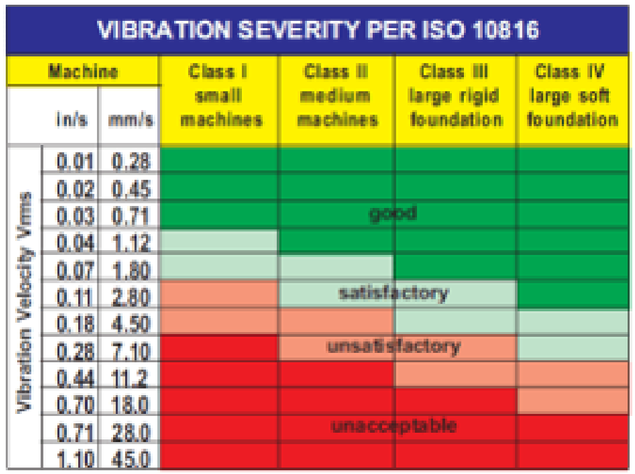




Recirculation Skid – High Vibration Resolution

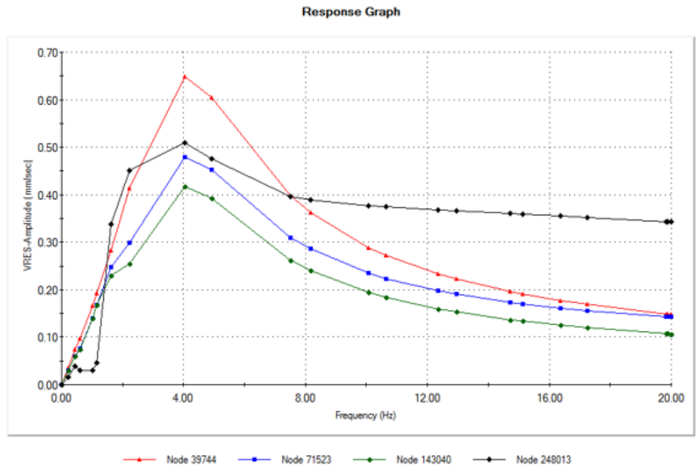
The recirculation vessel structure was experiencing a large vibration amplitude at the operating frequency.
Customer approached Conceptia to understand the root cause of this occurrence.
After due observation of the physical model, we carried out the studies using FEA to pinpoint likely high vibration due to resonance due to forcing frequency from pump-motor. The skid was subjected to natural frequency & spectral analysis.
The proposed solution of isolation of source and due stiffening to shift the natural frequency away from the operating frequency obviated the problem. The client has standardized this approach for all their new designs





VIBRATION SEVERITY PER ISO 10816

Machine		Class I small machines	Class II medium machines	Class III large rigid foundation	Class IV large soft foundation
in/s	mm/s				
Vibration Velocity Vrms 0.01	0.28				
0.02	0.45				
0.03	0.71		good		
0.04	1.12				
0.07	1.80				
0.11	2.80		satisfactory		
0.18	4.50				
0.28	7.10		unsatisfactory		
0.44	11.2				
0.70	18.0				
0.71	28.0		unacceptable		
1.10	45.0				



Event Depiction

Airport walkthrough- Aircraft landing and arriving at the apron. A view from control tower

Awards & Accolades

INTERNATIONAL BUSINESS EXCELLENCE AWARD

BUREAU VERITAS Certification

CONCEPTIA SOFTWARE TECHNOLOGIES PVT. LTD.

Conceptia®

NO. 22, 'DIVYA SHOBHA', 6TH BLOCK, BANASHANKARI 3RD STAGE,
3RD PHASE, OUTER RING ROAD, BANGALORE – 560 085, KARNATAKA, INDIA

Bureau Veritas Certification Holding SAS – UK Branch certifies that the Management System of the above organization has been audited and found to be in accordance with the requirements of the Management System standard detailed below.

Standard

ISO 9001:2015

Scope of certification

DESIGN, DEVELOPMENT AND PROVIDING ENGINEERING SERVICES IN COMPUTER AIDED DESIGN FOR MARINE APPLICATION

Original cycle start date: **08 September 2007**
Expiry date of previous cycle: **07 September 2016**
Recertification Audit date: **11 August 2016**
Recertification cycle start date: **08 September 2016**
Subject to the continued satisfactory operation of the organization's Management System, this certificate expires on: **07 September 2019**
Certificate No. **IND16.7453Q/U** Version : **2** Revision date: **01 August 2018**

Signed on behalf of BVCH SAS – UK Branch
Ramesh KOREGAVE
Director, CERTIFICATION
South Asia Region

UKAS MANAGEMENT SYSTEMS 0008

Certification body address: 5th Floor, 66 Prescot Street, London, E1 8HG, United Kingdom.

Local office: Bureau Veritas (India) Private Limited (Certification Business) 72 Business Park, Marol Industrial Area, MIDC Cross Road "C", Andheri (East), Mumbai – 400 093, India.

Further clarifications regarding the scope of this certificate and the applicability of the management system requirements may be obtained by consulting the organization. To check this certificate validity please call +91 22 6274 2000.

QMS ISO 9001 CERTIFICATION

Awards & Accolades

“SALES ROOKIE AWARD H1 2008” ASIA PACIFIC 2008

“OVER 90’S CLUB SUBSCRIPTION SERVICE” 2007

“TOP SALES AWARD” ASIA PACIFIC 2008 & 2009

“BEST GROWTH PERFORMANCE” INDIA 2007

ONE STOP SHOP- ENGINEERING SERVICES

Summary of Services Offered

MANUFACTURING

- Access Solutions
- Reengineering
- Retro fitment
- SPM – Concept to delivery

CAD/CAE ANALYSIS

CFD Analysis:

- Thermal
- Hydraulic
- Lift & Drag
- Electronics cooling

PLASTICS:

- Mould Flow

FEA Analysis:

- Static
- Vibration
- Shock
- Fatigue & Creep
- Drop test
- Non linear
- Thermal
- EM Analysis

DESIGN & SUPPORT SERVICE

- Pump for pressure testing
- Pressure gauges
- Compressor no. pneuniatigtes1
- Pressure/holding and resuse valve

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THANK YOU