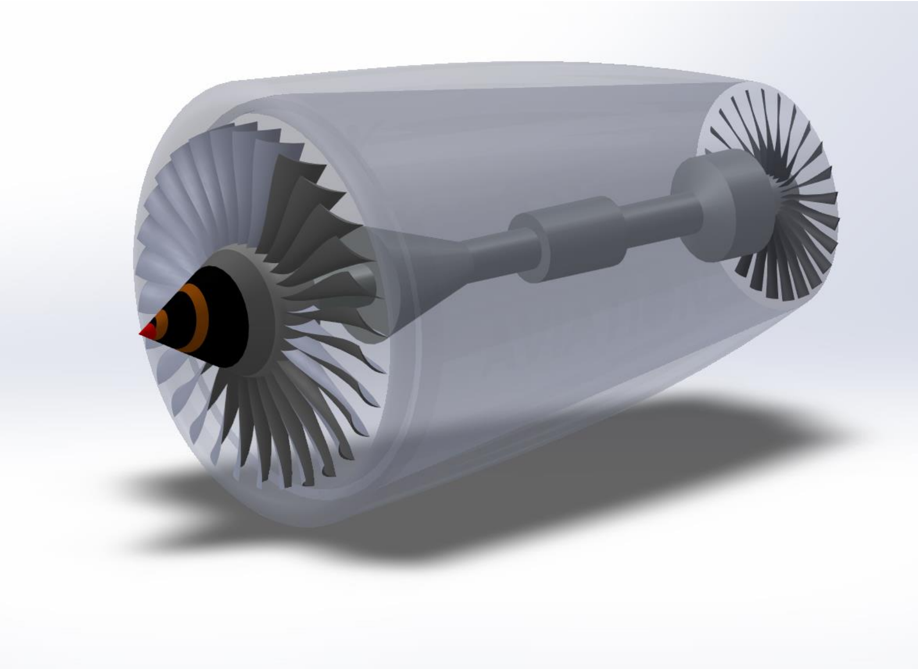


MANGIRISH SANJEEV KULKARNI

M.S. in Mechanical Engineering, Arizona State University, USA-3.6 Gpa. (August 2021-Present)

Masters in Computer-Aided Design, Apollo Institute of Technology, India. (May 2019)

B.E. Mechanical Engineering, Pune University, India, Percentage- 65% (July 2017)

Ansys Certification from CADD training services pvt ltd- Jul 2016

WORK EXPERIENCE

Arizona State University, USA

- Mechanical Design Specialist, Research Assistant, Bio-Design Institute (Nov 2022– Present)
- Mechanical Boiler Assembler, Bio-Design Institute (Jan 2022– April 2022)
- Electric Canoe Design Position, Solar Canoes Against Deforestation (SCAD) Project (May 2022–Aug 2022)

Senior Product Engineer-Engine & BIW Structure, Global Technology Services, India (April 2018 – May 2020)

GET-Engine Research and Development, Champ Energy ventures Ltd, India (Nov 2017– March 2018)

Internship and Teaching Experience-

❑ Assistant Professor-FEA and Product Design, Apollo institute, India (July 2020 – April 2021)

❑ Project Intern-CFD, ScrewTech Engineering Ltd, Pune (Aug 2016– May 2017)

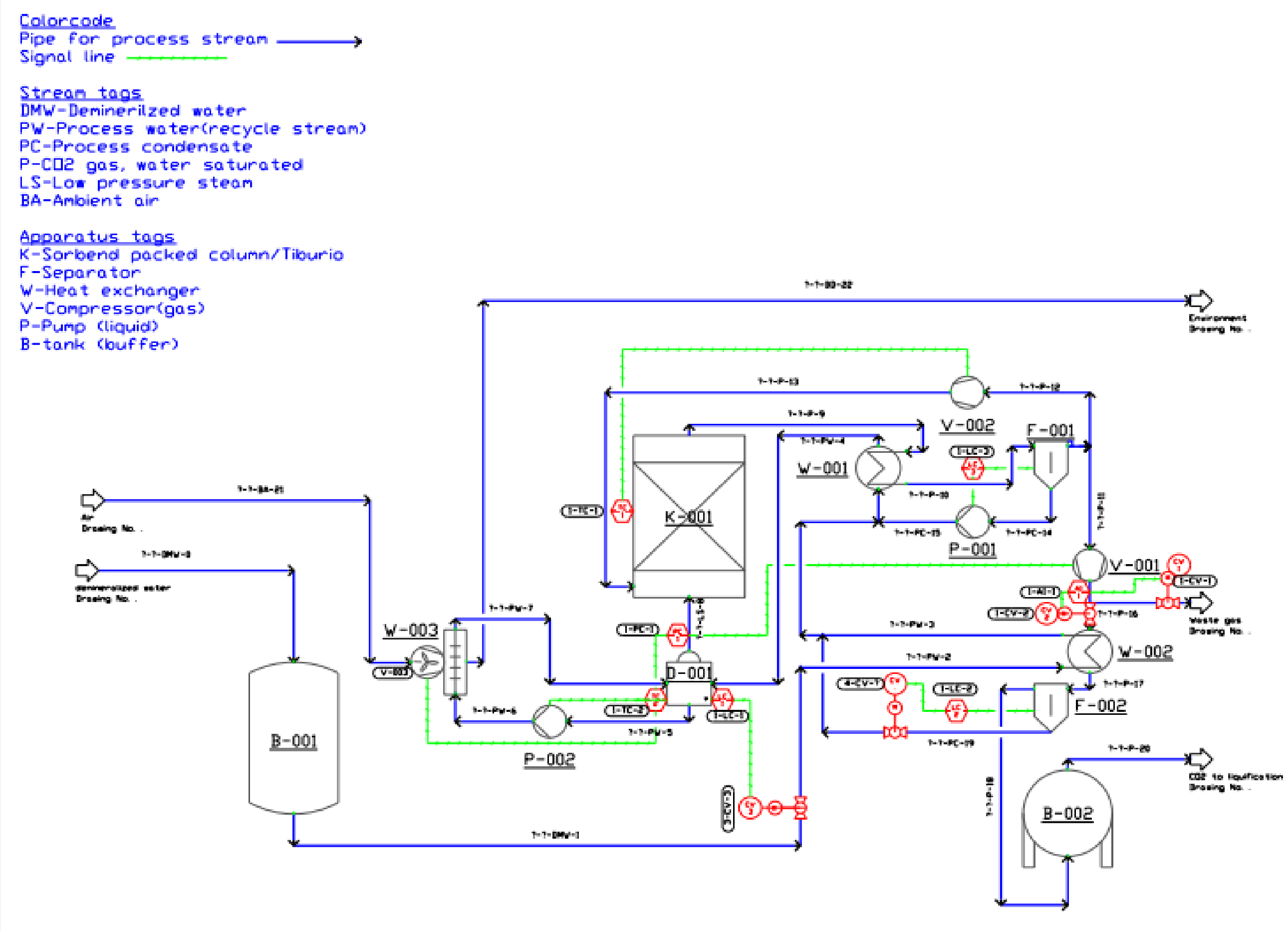
❑ Management Intern, Cummins India Ltd, India (Dec 2015– Jan 2016)

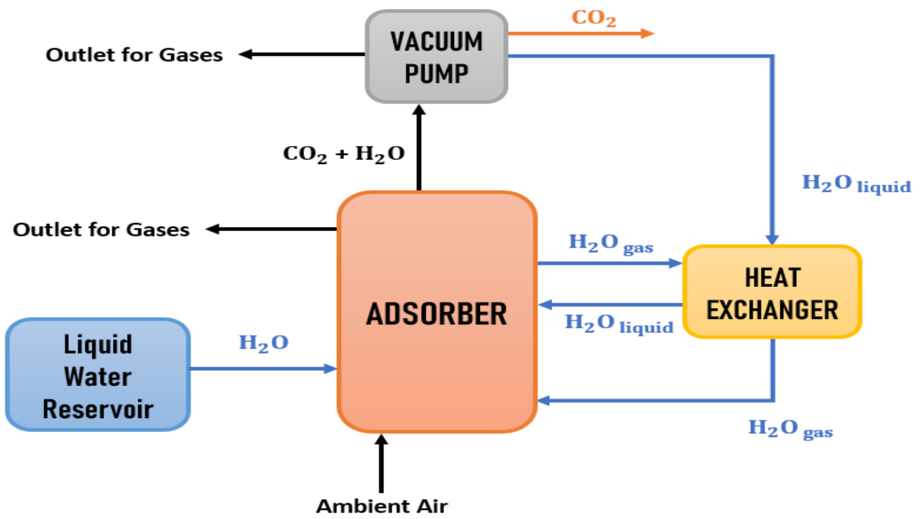
SOFTWARE PACKAGES AND DOMAIN-

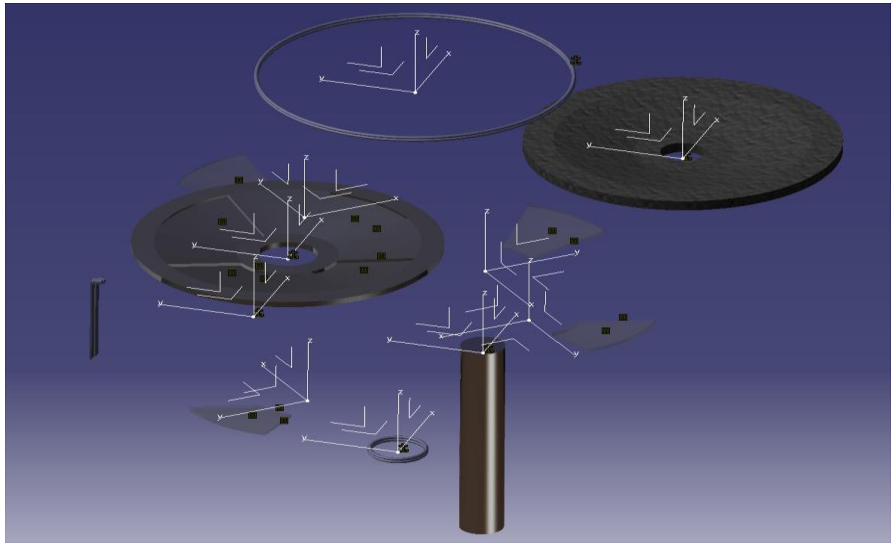
• Modelling: CATIA V5, Unigraphics NX, SolidWorks, AutoCAD, Simulink, Car-Sim.
• Computational Analysis: ANSYS, Abaqus, LS Dyna, Hyper Mesh-Opti struct, MSC-Nastran.
• Programming Language: MATLAB-Simulink (Advance), Python (Basic), Wolfram Alpha.
• Statistical Data Analysis: Minitab, Microsoft Office, Aspen Plus.

● Product Development & Planning - Body in White-Chassis, Plastic, Sheet-Metal Design & Optimization.
● Manufacturing & Testing – Sheet-Metal Fabrication, Lean manufacturing tools. Engine, Vibration & Endurance Testing.
● FEA and Controls- NVH, HVAC, Crash, Durability & Reliability analysis. Risk Assessment, Simulink-Vehicle Dynamics.
● Project Management and Scripting- APQP/FMEA-(DFMEA/DVP&R), SAP PS, MATLAB and Python Scripting.

RESEARCH ASSISTANT
AUTOTHERMAL REGENERATION PROJECT-ASU

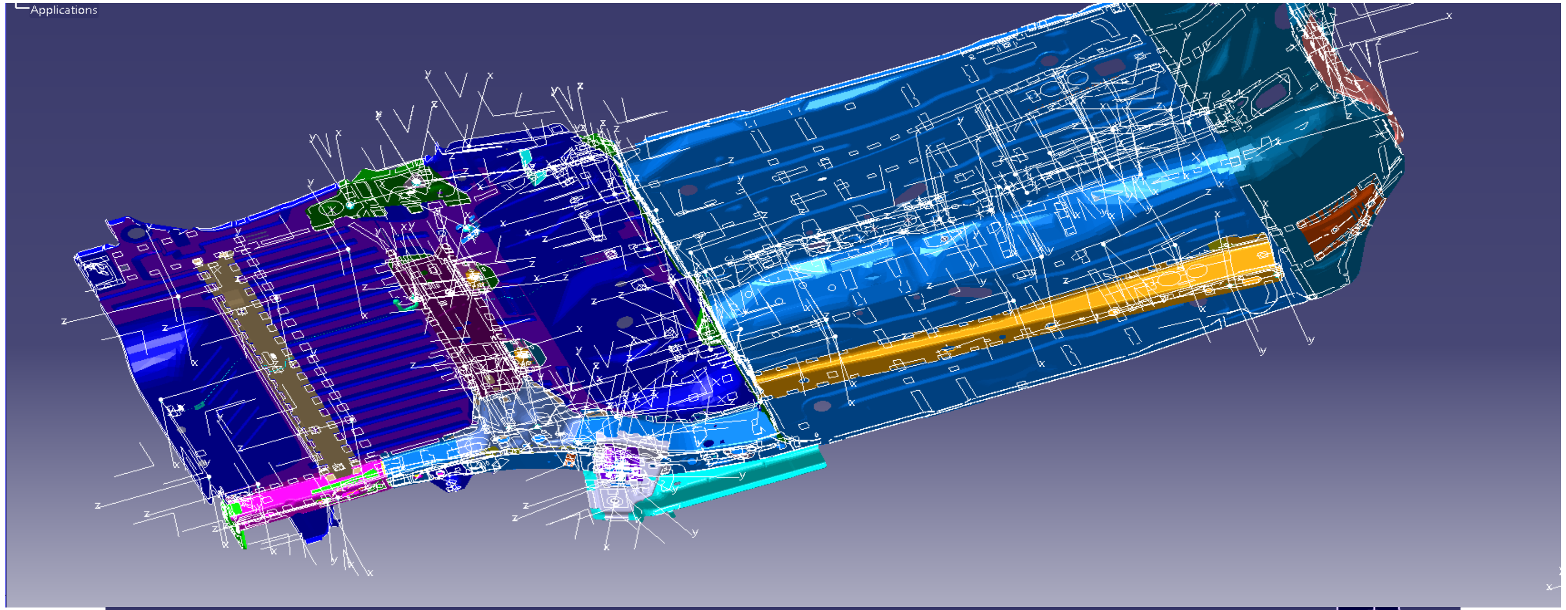


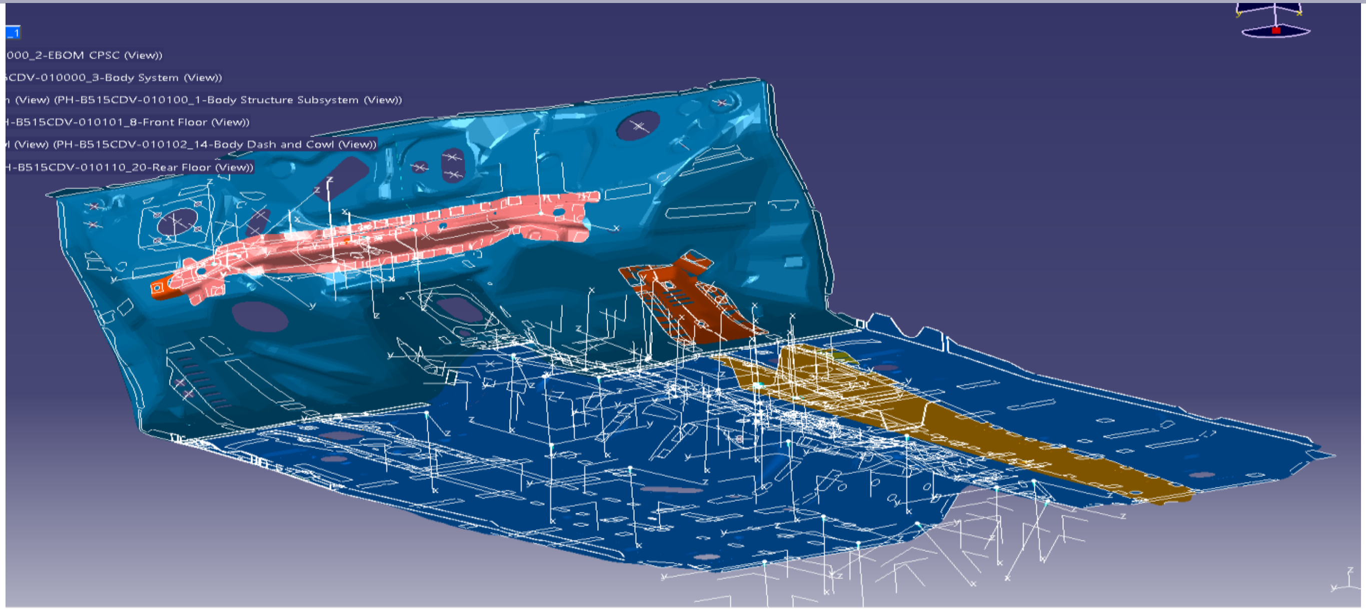




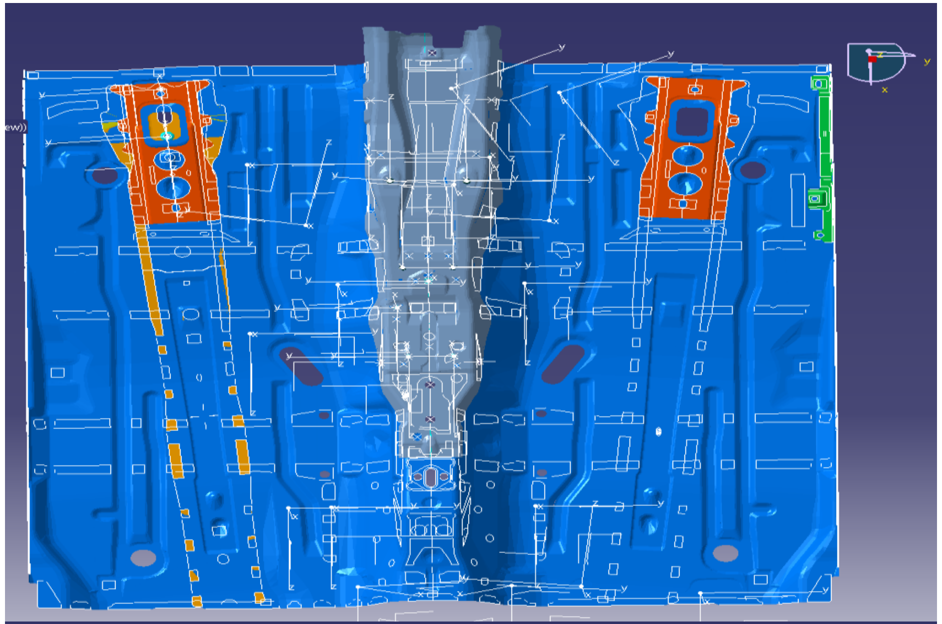
2023

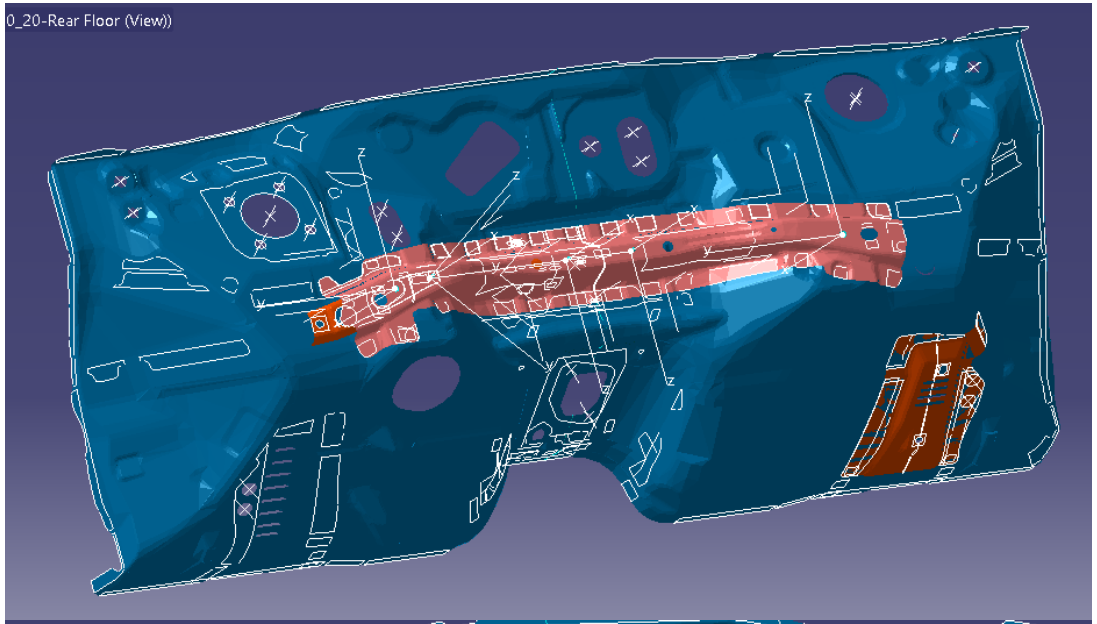
GLOBAL TECH- LOWER FLOOR

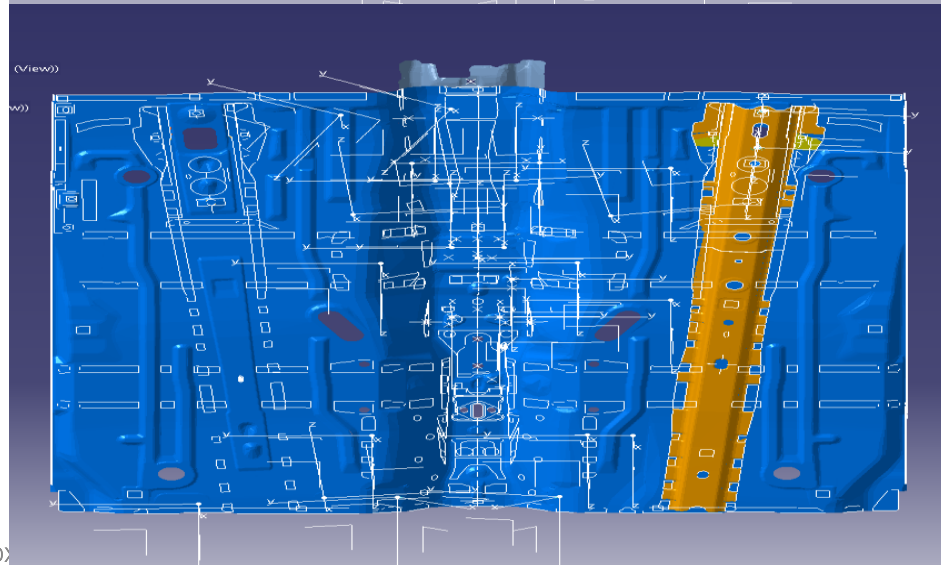


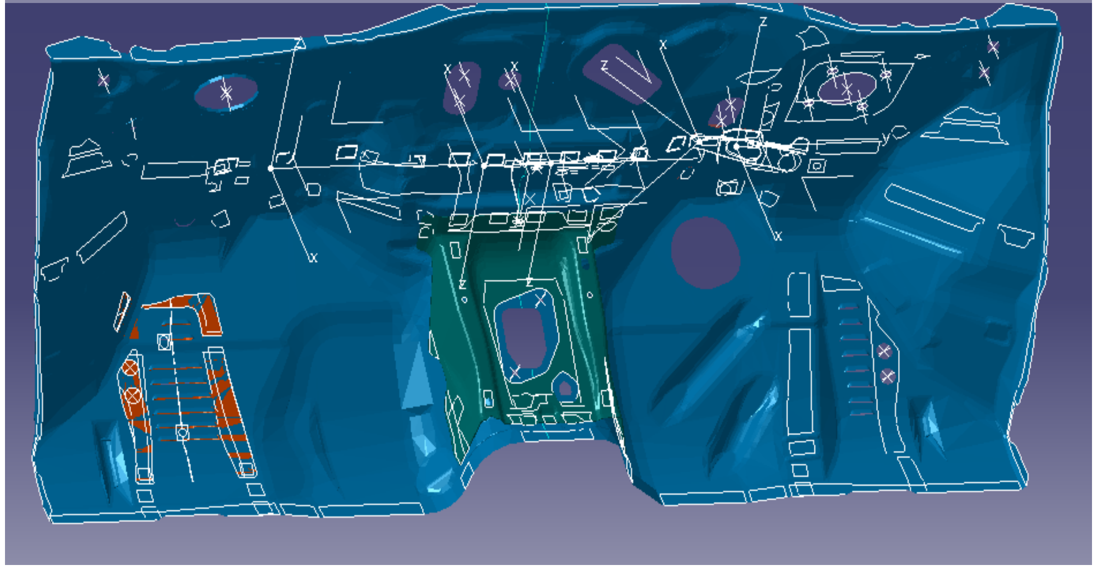


LOWER FLOOR-CONTINUED

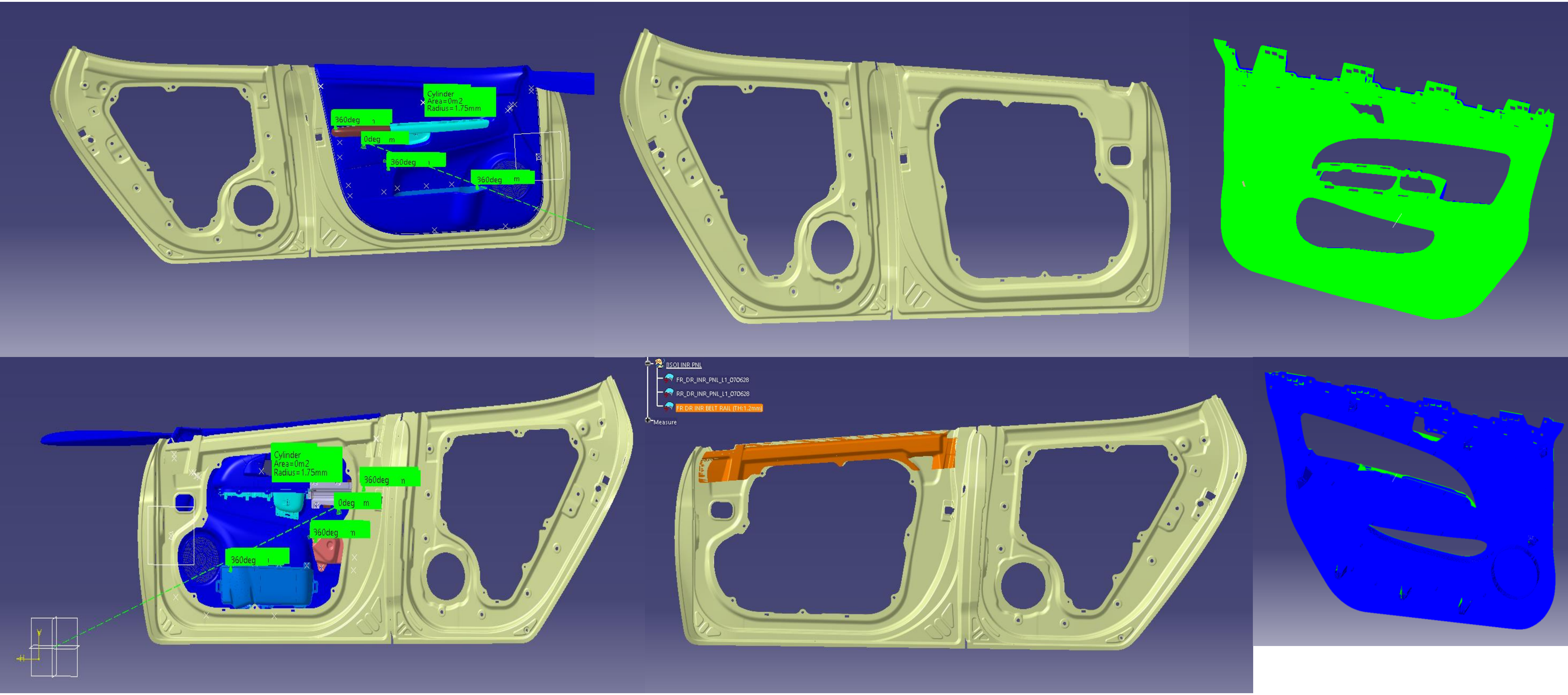




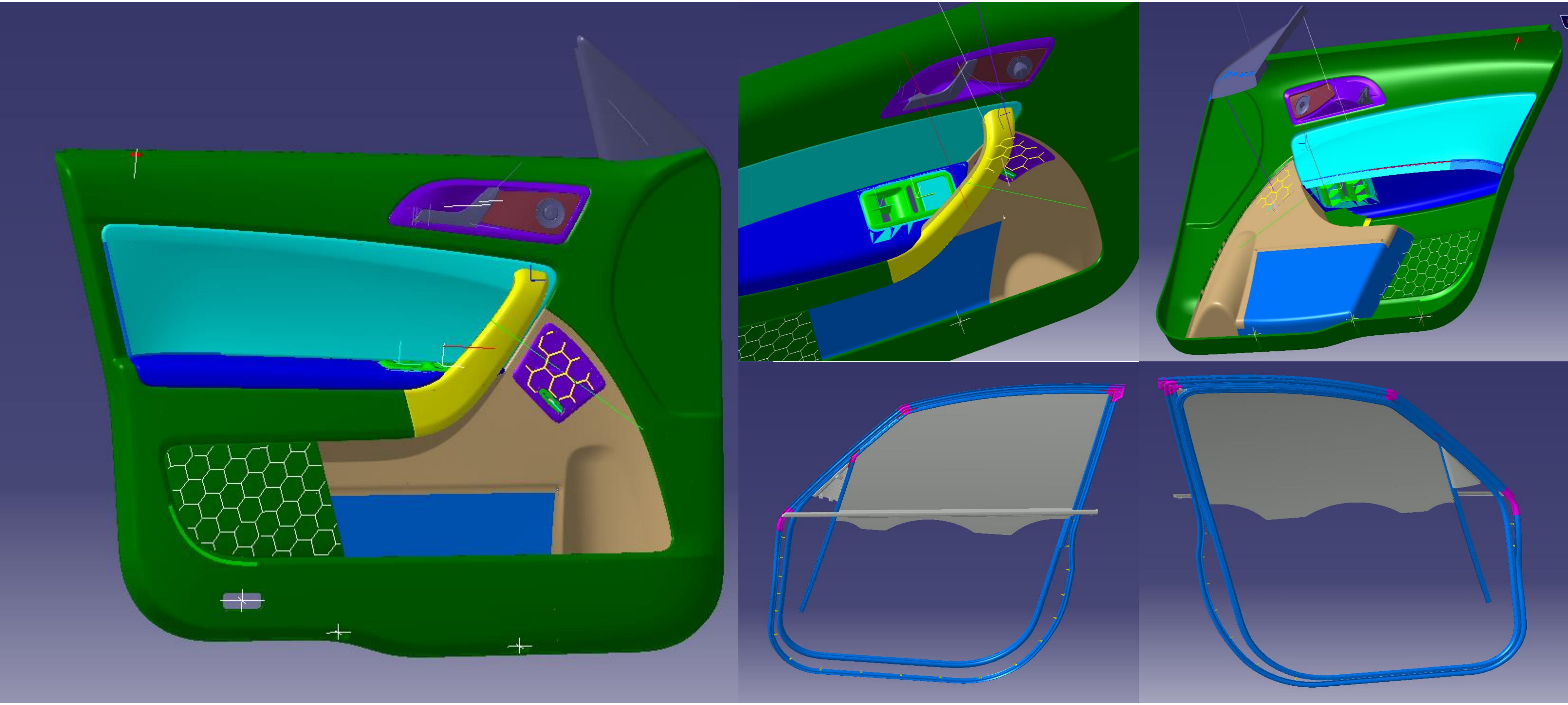




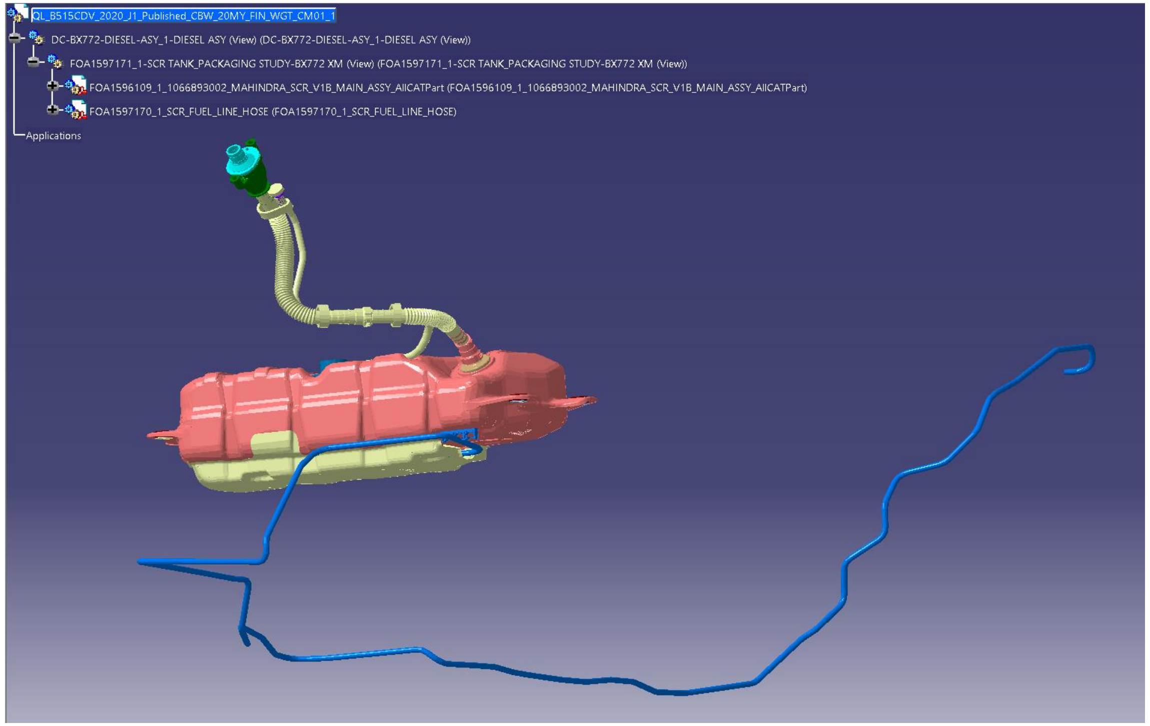
DOOR TRIM & BI -PLASTIC PRODUCT DESIGN

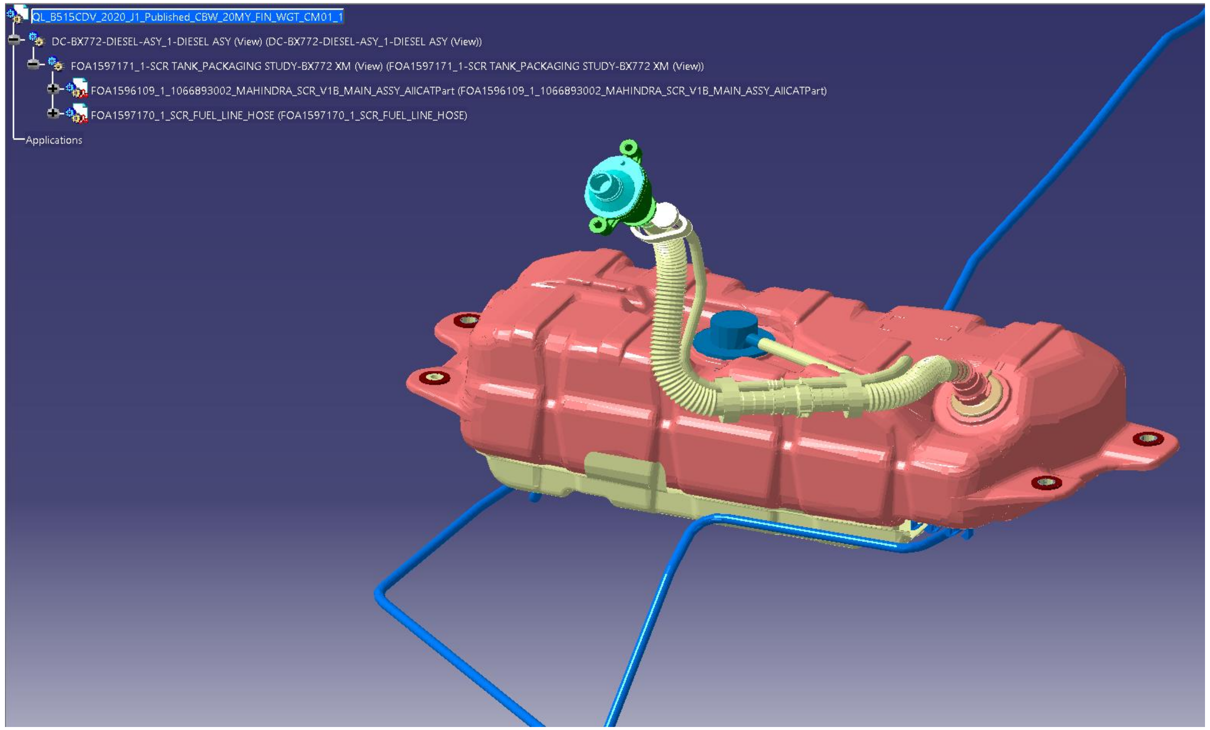


DOOR TRIM & WEATHER STRIP -PLASTIC PRODUCT DESIGN

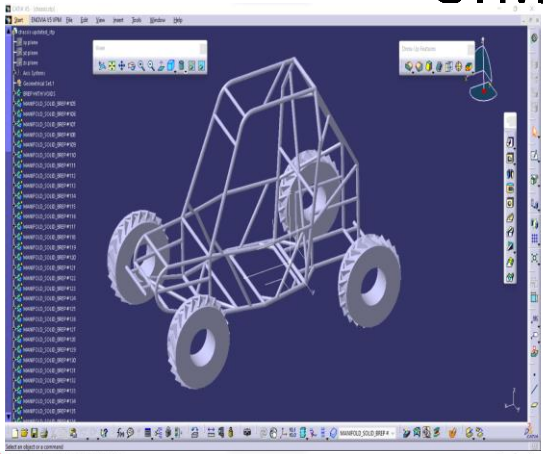


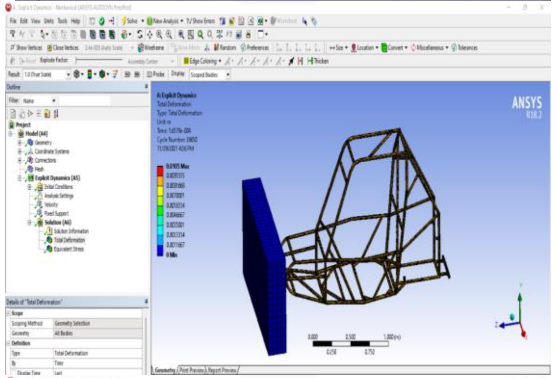
PIPING DESIGN

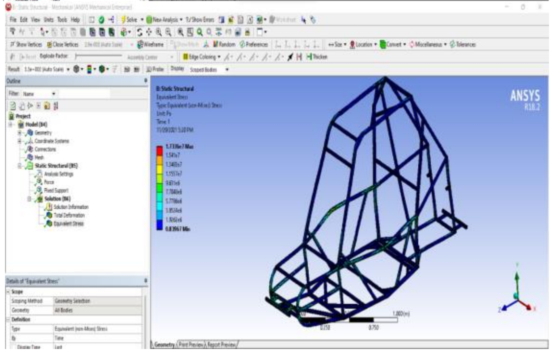




RELIABILITY ANALYSIS OF STATIC STRUCTURAL AND CRASH SIMULATION OF VEHICLE ARCHITECTURE.







FORM 2- 4130 Carbon Moly Steel-

Input variables for limit state equation- g= (F-v*25*t^-1)
Note-Here mass is calculated and kept constant as its standard deviation value was close to zero.

Initial value	Type	u	sigma	lamda	kesi
F	Lognormal	227	22.7	5.419974852	0.00995
v	Lognormal	50.09	5.896575	3.906940006	0.0137
t	Normal	20.4	5.944185		

Output Parameters-

Beta Difference- -0.315857366

Beta – 5.141318479

Probability of Failure- 1.36409E-07

FORM 2- Docol R8 Steel-

Input variables for limit state equation- g= (F-v*23*t^-1)
Note-Here mass is calculated and kept constant as its standard deviation value was close to zero.

Initial value	Type	u	sigma	lamda	kesi
F	Lognormal	227	22.7	5.419974852	0.00995
v	Lognormal	50.09	5.896575	3.906940006	0.0137
t	Normal	20.4	5.944185		

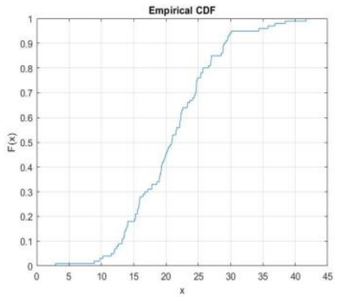
Output Parameters-

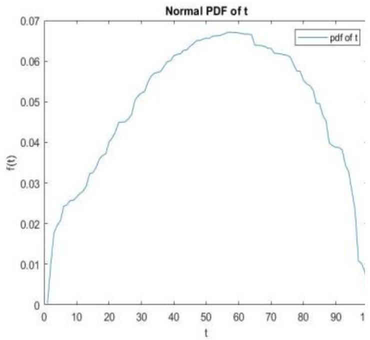
Beta Difference- 5.489966895

Beta – 5.489966895

Probability of Failure- 2.01005E-08

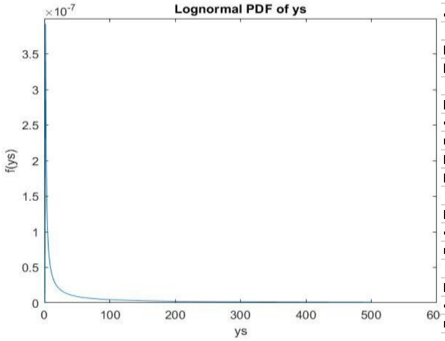
As we can see the **Probability of Failure Is Low** in Docol R8 Steel than 4130 Carbon Moly Steel. Thus, this further verifies the FEA analysis we performed in the initial stage.






```
Monte1-A
A_S=rand(1000000,1);
A_E=rand(1000000,1);
lambda_S=6.610561026;
kesi_S=0.038925022;
U_E=200060;
sigma_E=14899.4;
K=1;
Nf=0;
S=zeros(1000000,1);
E=zeros(1000000,1);
g=zeros(1000000,1);
while K<=1000000

S(K,1)=exp(lambda_S+kesi_S*norminv(A_S(K,1)));
   E(K,1)=U_E+sigma_E-norminv(A_E(K,1));
   g(K,1)=((S(K,1))-(0.002*E(K,1)));
   if g(K,1)<0
      Nf=Nf+1;
   end
   K=K+1;
end
Probability_Of_Failure=Nf/1000000
 Probability_Of_Failure = 0.48346211
```



Initial value	Type	u	sigma	lamda	kesi
F	Lognormal	227	22.7	5.4199749	0.00995033
v	Lognormal	50.09	5.896575	3.90694	0.01376276
t	Normal	20.4	5.944185		
	#1	#2	#3		
Lamda F	5.419974852	5.419974852	5.41997485		
Kesi F	0.099751345	0.099751345	0.09975135		
Lamda v	3.906940006	3.906940006	3.90694001		
Kesi v	0.117314801	0.117314801	0.1173148		
F	227	127.9524654	194.121833		
v	50.09	53.4962214	46.5840117		
t	20.4	-0.02392463	-11.768978		
g	165.6151961	56028.73287	293.076924		
Eqv. Norm Mean F	225.8706374	200.6699014	223.529133		
Eqv. Norm Std.Dev. F	22.64355534	12.76343053	19.3639139		
Eqv. Norm Mean v	49.74531161	49.60859657	49.6437717		
Eqv. Norm Std.Dev. V	5.876298384	6.275898569	5.46499407		
Eqv. Norm Mean t	20.4	20.4	20.4		
Eqv. Norm Std.Dev. T	5.944185	5.944185	5.944185		
F'-correlated	0.049875673	-5.69732689	-1.5186651		
v'-correlated	0.058657401	0.6194531	-0.5598835		
t'-correlated	0	-3.43595037	-5.41184		
F''-uncorrelated	0.04487461	-5.4505121	-0.9989959		
v''-uncorrelated	0.04487461	-5.4505121	-0.9989959		
t''-uncorrelated	0.04487461	-5.4505121	-0.9989959		
dg/dF	1	2	3		
dg/dv	-1.225490196	1044.948203	2.12422864		
dg/dt	3.009059016	2336536.801	8.40812961		
dg/dF''	22.64355534	25.52686107	58.0917418		
dg/dv''	-5.2517296	6536.451374	16.5018638		
dg/dt''	19.23303416	13774004.75	56.0428002		
DG	30.16986684	13774006.3	82.3878475		
DG2	910.2208654	1.89723E+14	6787.75742		
F'' new	-4.079121585	-1.0114E-05	-3.6251481		
v'' new	0.946072436	-0.0025897	-1.0297798		
t'' new	-3.464733502	-5.45717523	-3.4972862		
beta	5.434948408	5.457175844	5.14131848		
Beta diff		0.022227436	-0.3158574		
F'-new-correlated	-4.324328515	-0.51303361	-4.0412639		
v'-new-correlated	0.638311662	-0.48193654	-1.3332576		
t'-new-correlated	-3.435950367	-5.41183996	-3.4682327		
F-new-correlated	127.9524654	194.1218326	145.274448		
v-new-correlated	53.4962214	46.58401174	42.357527		
t-new-correlated	-0.023924631	-11.7689779	-0.2158165		
g-new	56028.73287	293.0769245	5051.93347		
Probability of failure	1.36409E-07				

DESIGN OPTIMIZATION OF A BRAKE DISC-DOE AND RESPONSE SURFACE OPTIMIZATIUON

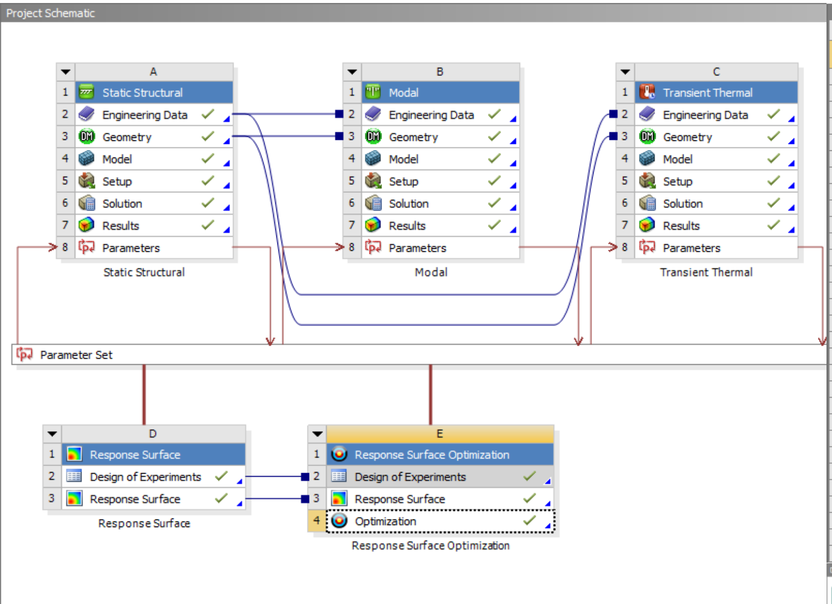
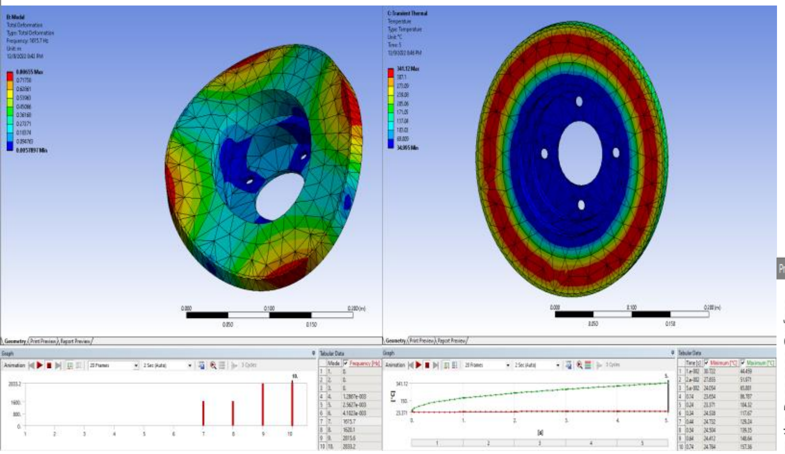
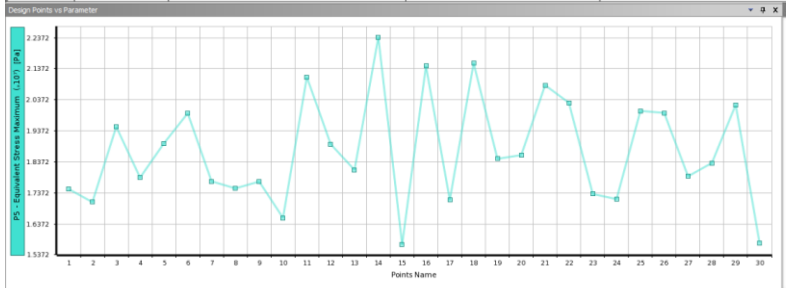
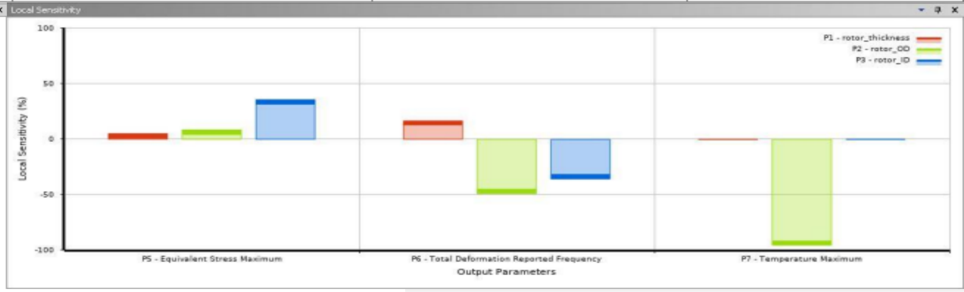


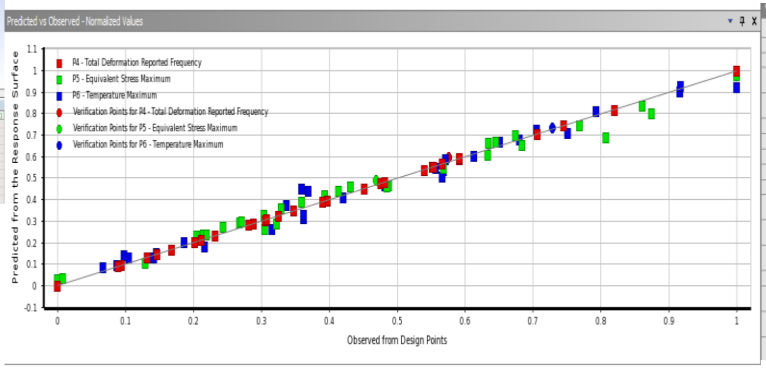
Table of Schematic D2: Design of Experiments (Latin Hypercube Sampling Design : User-Defined Samples : Random Generator Seed = 0 : Number of Samples = 30)

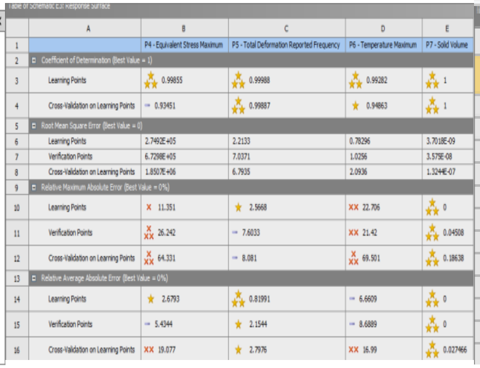
	A	B	C	D	E	F	G
1	Name	P1 - rotor_thickness (mm)	P2 - rotor_OD (mm)	P3 - rotor_ID (mm)	P4 - Total Deformation Reported Frequency (Hz)	P5 - Equivalent Stress Maximum (Pa)	P6 - Temperature Maximum (C)
2	1	24.7	127.2	68.2	1632.8	1.7497E+07	340.24
3	2	25.7	127.73	73.8	1608.6	1.7075E+07	340.24
4	3	22.1	125.07	74.6	1580.6	1.9505E+07	349.3
5	4	25.1	128.8	77.8	1515.7	1.7864E+07	341.19
6	5	22.5	124	71	1652.6	1.8969E+07	350.67
7	6	27.5	122.13	79.8	1593.5	1.9938E+07	343.62
8	7	24.9	129.33	72.6	1575.1	1.7747E+07	342.2
9	8	27.3	129.07	78.6	1531.6	1.7518E+07	336.71
10	9	23.5	125.87	71.4	1625.6	1.7738E+07	340.2
11	10	23.1	129.87	77	1486.6	1.6567E+07	345.85
12	11	23.9	125.6	75.8	1573.3	2.1104E+07	340.35
13	12	22.9	124.53	69.8	1656.3	1.8944E+07	345.43
14	13	24.5	126.13	78.2	1527.2	1.8111E+07	343.59
15	14	26.1	122.4	71.8	1738.6	2.2388E+07	343.42
16	15	23.7	128.53	74.2	1557.9	1.5706E+07	343.65
17	16	26.9	125.33	73.4	1668.3	2.1462E+07	337.87
18	17	26.7	128.27	70.2	1656.9	1.7141E+07	336.64
19	18	25.5	124.8	69.4	1703.9	2.1552E+07	335.92
20	19	22.7	123.73	73	1634.8	1.8471E+07	347.29
21	20	22.3	123.47	77.4	1551.7	1.859E+07	349.32
22	21	24.3	122.67	79.4	1538.2	2.0842E+07	344.96
23	22	27.1	126.67	76.6	1586.7	2.0276E+07	335.75
24	23	27.7	128	72.2	1660.6	1.7337E+07	334.32
25	24	23.3	126.93	75.4	1548.8	1.7172E+07	346.6
26	25	26.3	122.93	79	1581.2	2.0015E+07	339.83
27	26	25.3	124.27	68.6	1715.6	1.9949E+07	337.36
28	27	26.5	127.47	75	1606.7	1.7907E+07	339.48
29	28	25.9	126.4	70.6	1668.4	1.8336E+07	336.03
30	29	27.9	123.2	69	1793.9	2.021E+07	335.42
31	30	24.1	129.6	76.2	1514	1.5761E+07	344.34

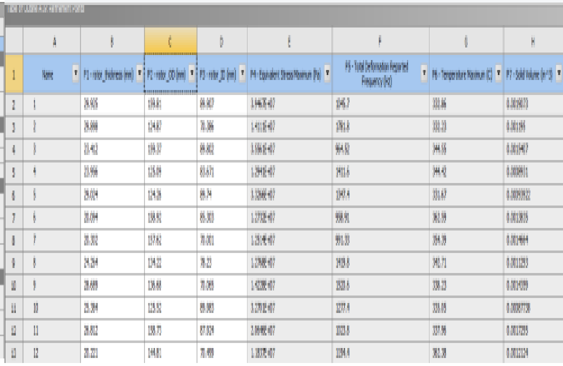












2023

IMPLEMENTATION OF NEW FACILITY LAYOUT TO IMPROVE PLANT UTILIZATION-STRING DIAGRAM

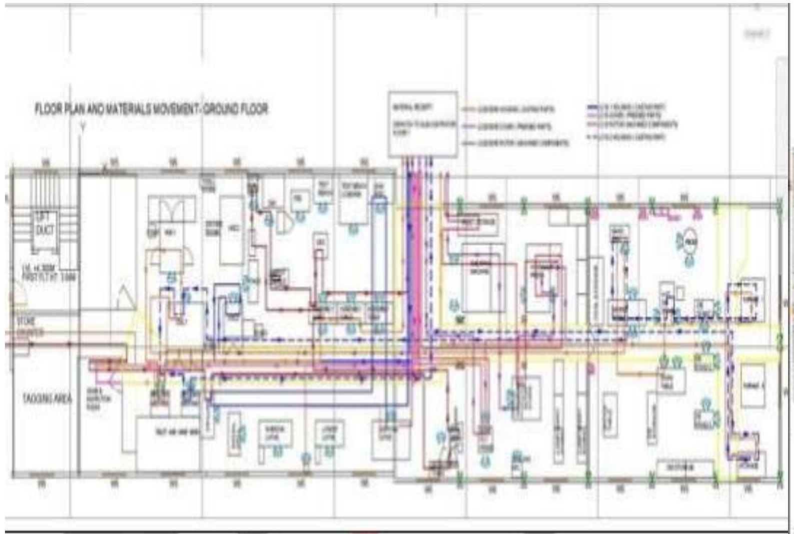


Figure 1 Current Ground Floor Layout.

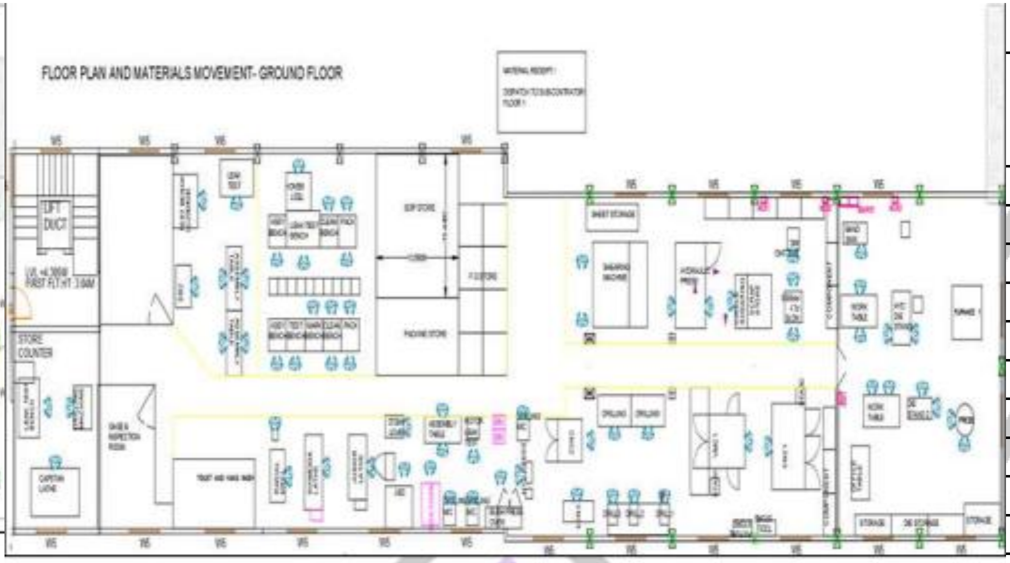


Figure 5 Proposed Layout 3 (Iteration 3).

Table 6 Comparative Table of Distance Travelled.

Product	Distance Travelled in Iteration 3 (ft.)	Distance travelled in the previous model
LC 10 -1 Housing	185.61	294.1
LC 10 Cover	137.68	229
LC 10- Rotor	275.93	370
LC10-2 Housing	300.03	506
LC20/30 Housing	395.17	478.42
LC20/30 Rotor	275.31	362
LC20/30 Cover	137.80	220
LC50 Housing	395.17	439.42
LC50 Rotor	275.31	318
LC50 Cover	137.80	164
Total Distance	2515.81	3380.94

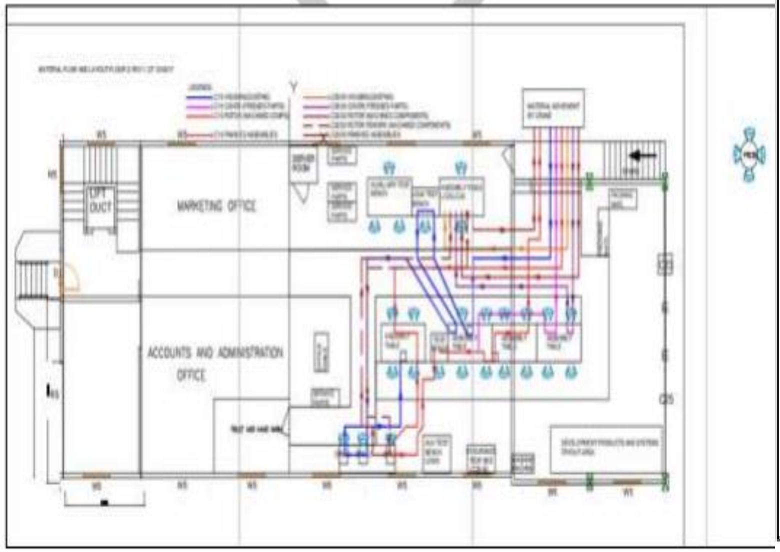


Figure 2 Current First Floor Layout.

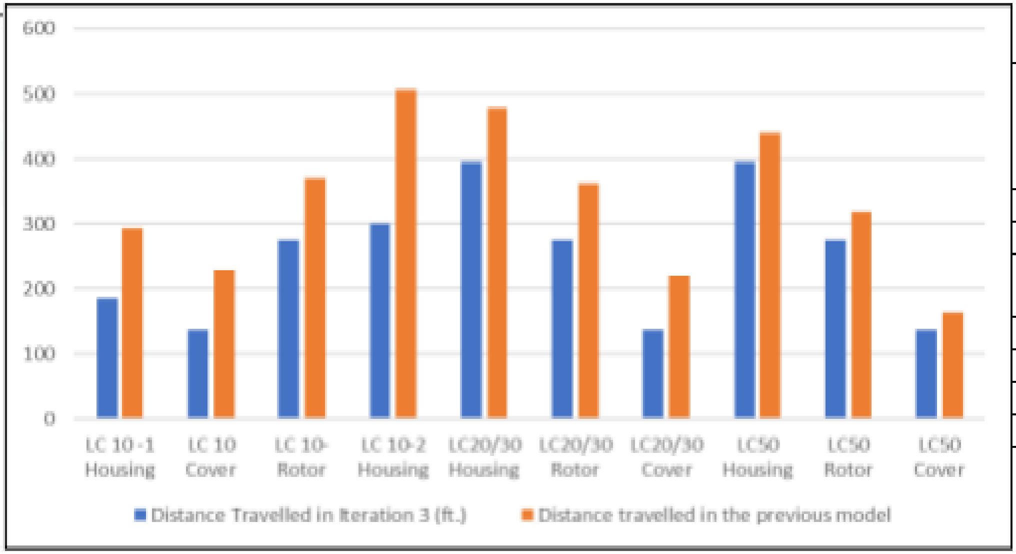


Figure 6 Graph Displays Benchmark of Total Distance Travelled.

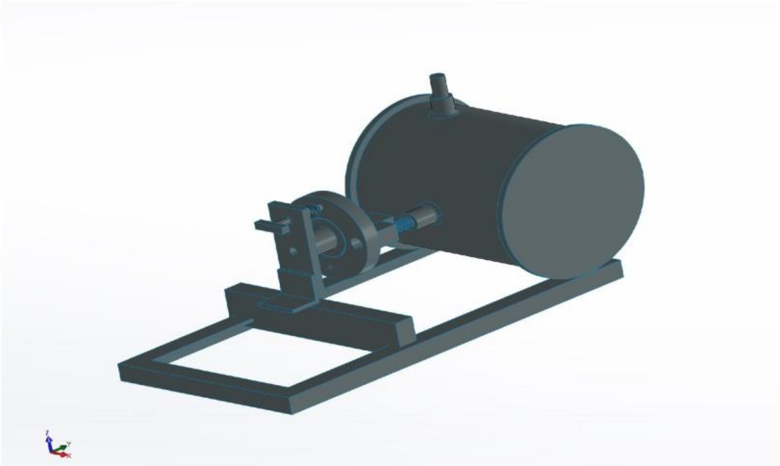
Table 5 Comparative Table of Area Utilization.

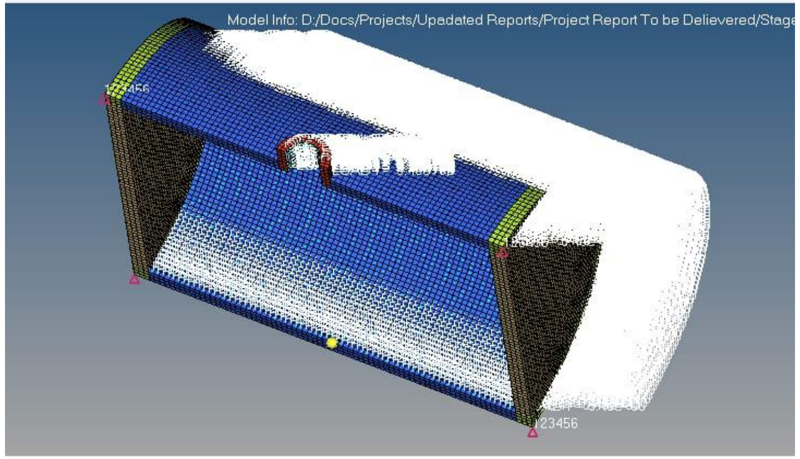
Description	Ground Floor (Proposed layout) (area occupied) in ft^2	Previous model Area occupied
Total shop floor area	4456	6721
Occupied by machines	1047.35	1047.35
Occupied by fixed store	315.75	315.75
BOP store	407.5280	-
Walkway	857	1534
Total occupied	2627.628	2897.1
Percentage	58.96%	43.11%

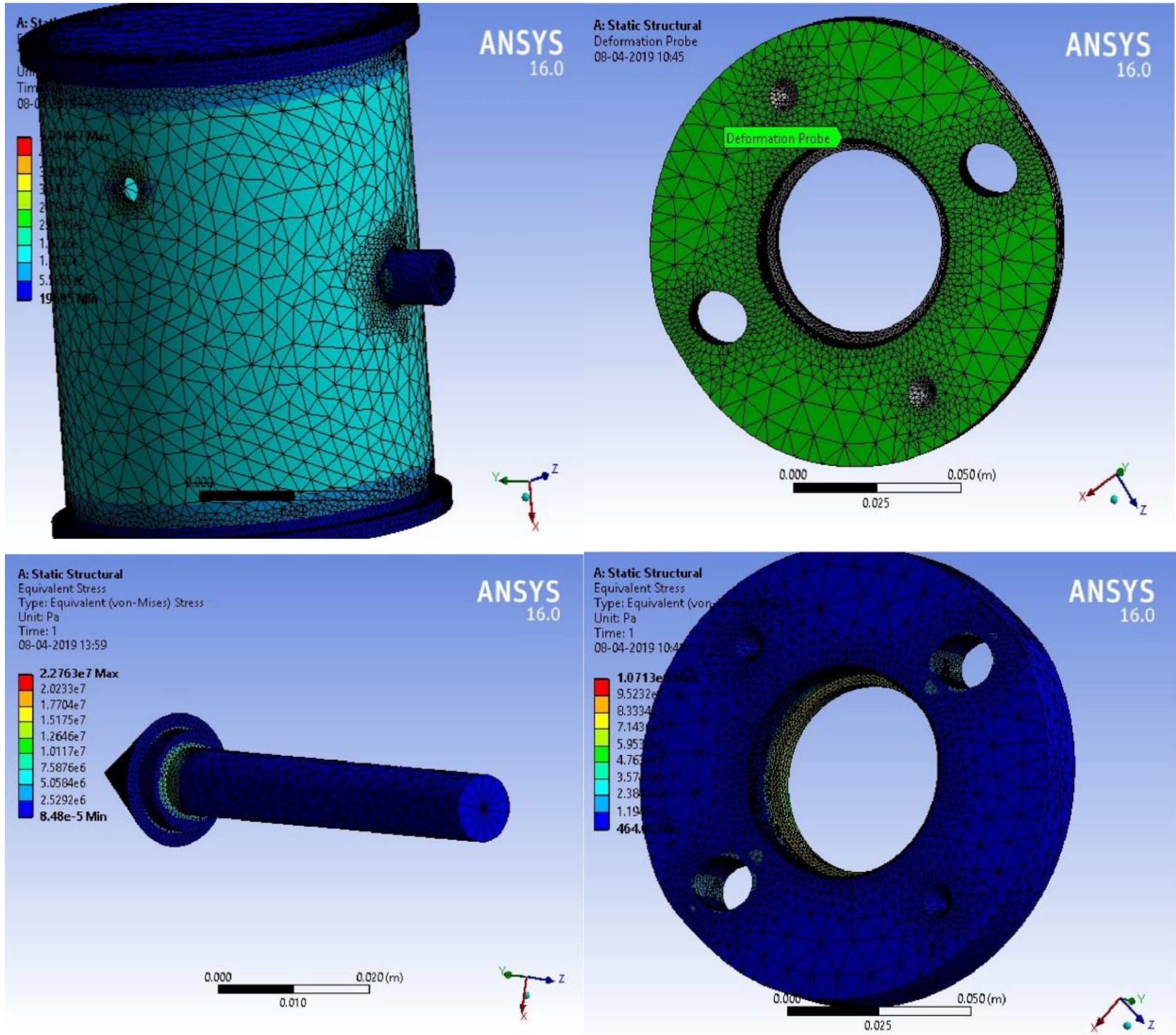
Result of reduction in distance travelling by 865.13ft. & also increased area utilization from 43.11% to 58.96%.

- https://www.ijsdr.org/papers/IJSDR2103077.pdf

Eco Friendly Pipe Hose Cleaning System

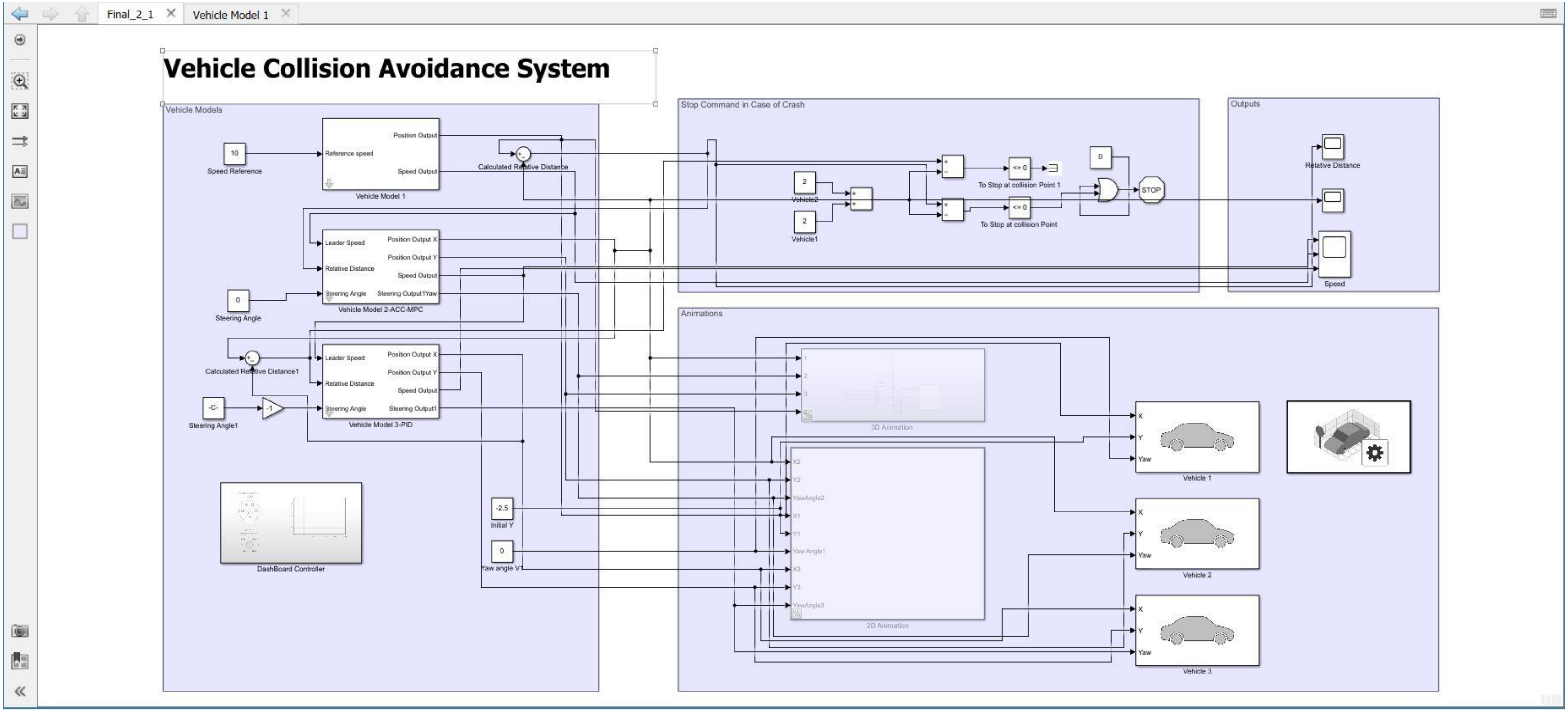




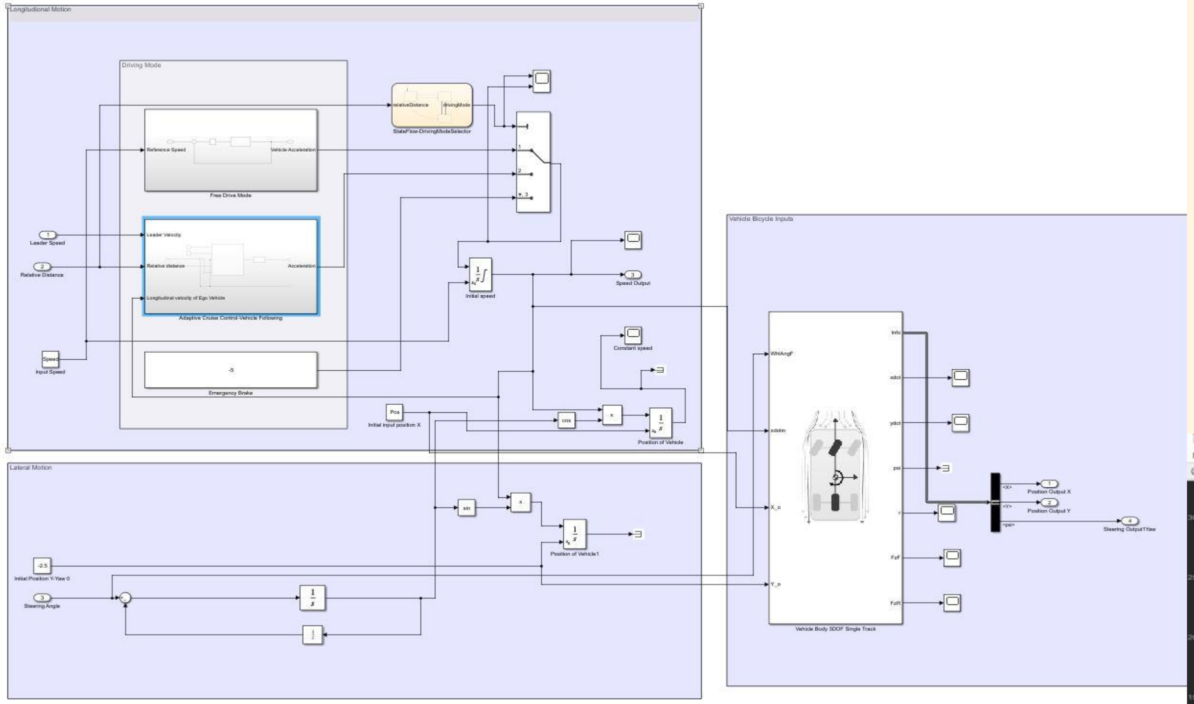


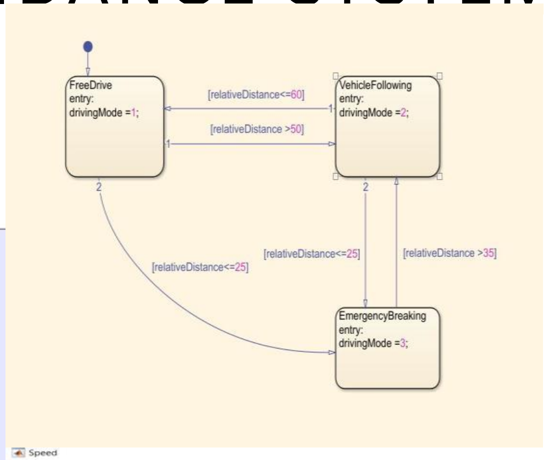
https://www.ijrte.org/wp-content/uploads/papers/v9i1/A1991059120.pdf

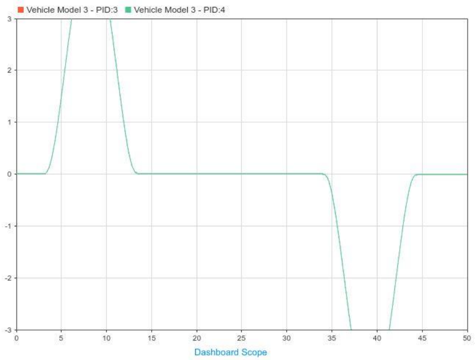
VEHICLE COLLISION AVOIDANCE SYSTEM

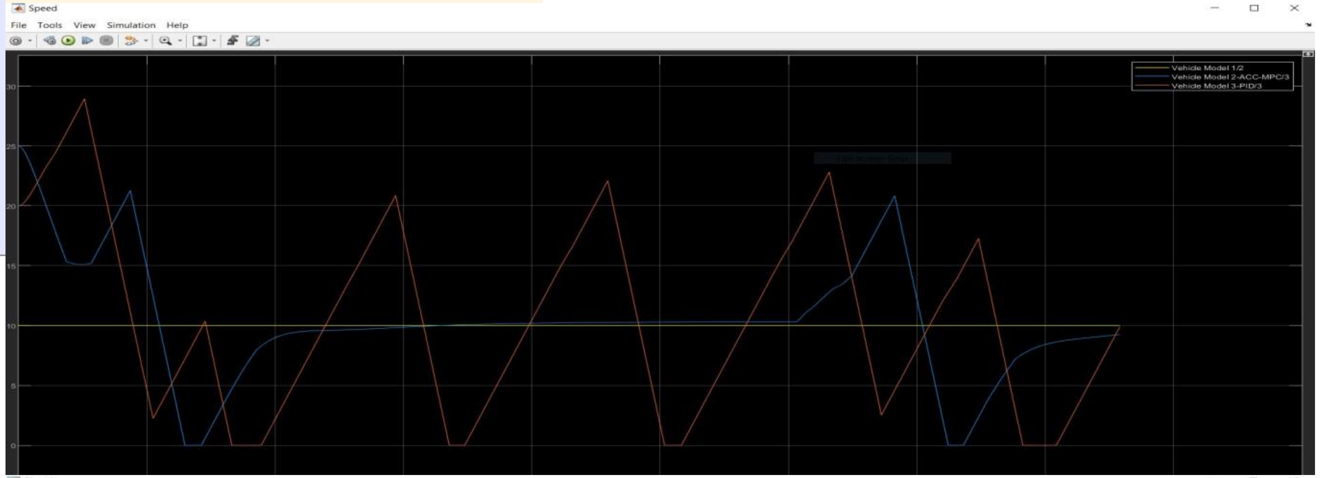


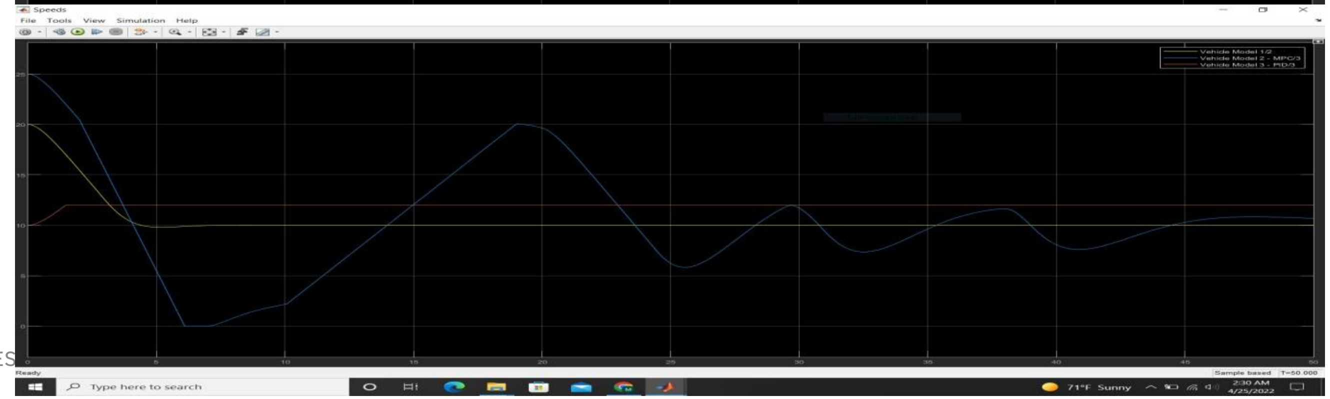
VEHICLE COLLISION AVOIDANCE SYSTEM-CONTINUED

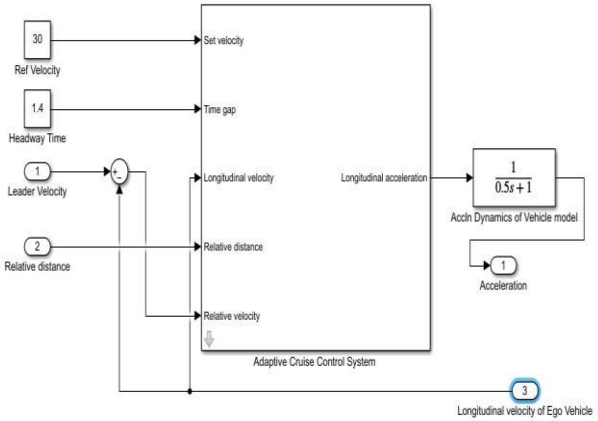


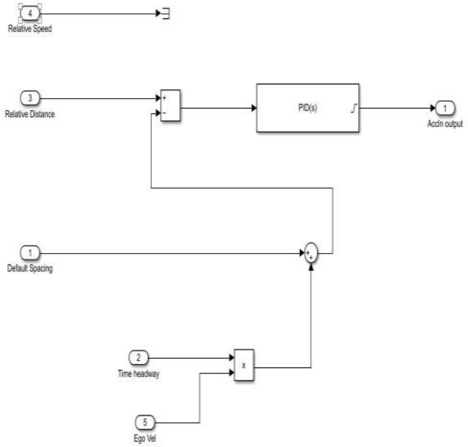












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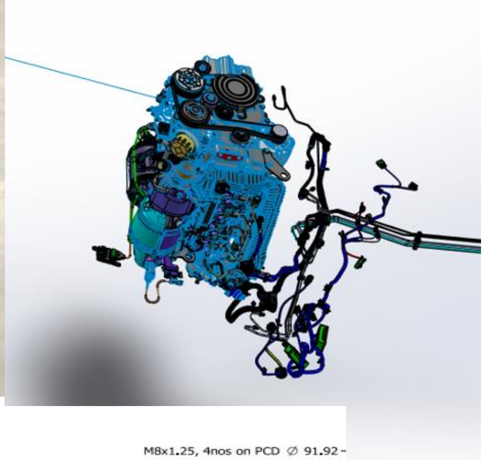
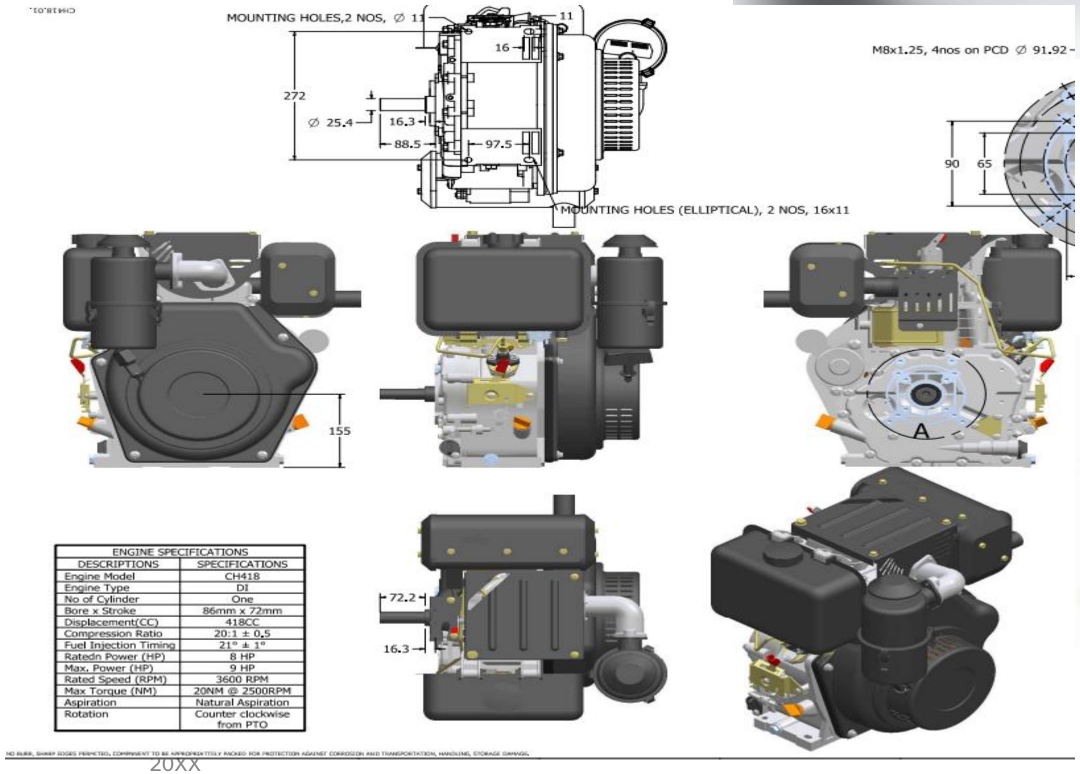
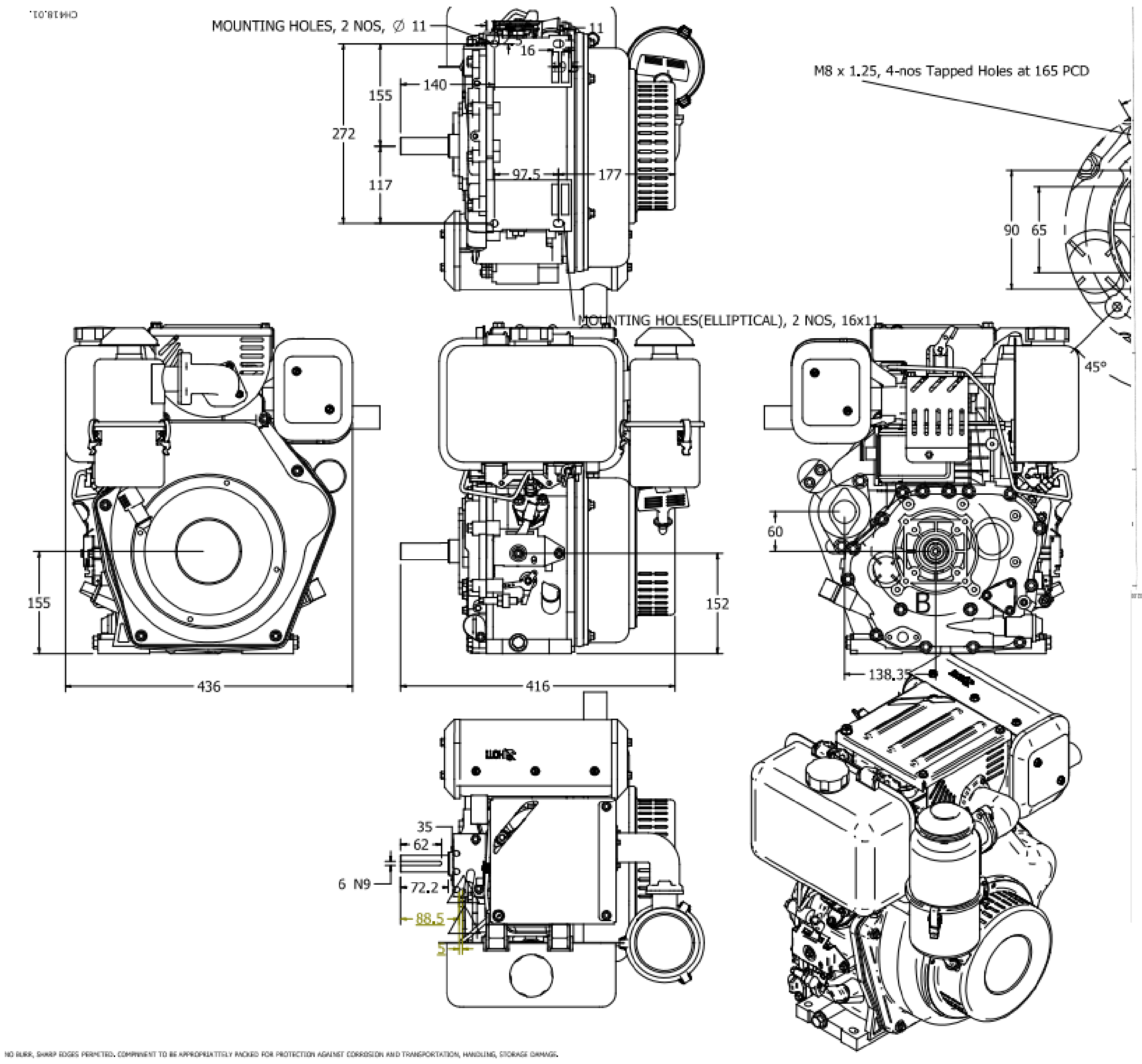
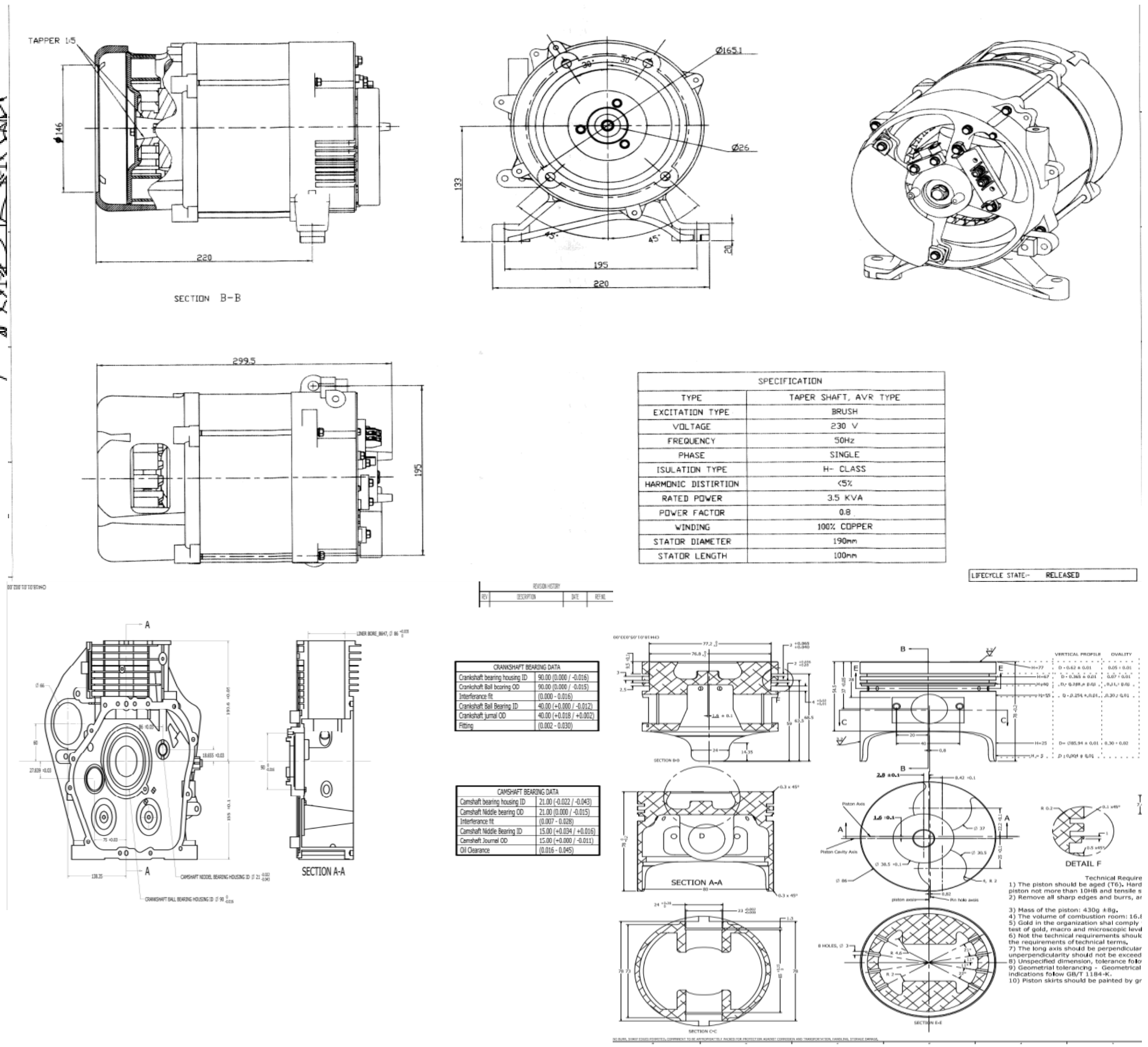




ENGINE SPECIFICATIONS	
DESCRIPTIONS	SPECIFICATIONS
Engine Model	CH418
Engine Type	DI
No of Cylinder	One
Bore x Stroke	86mm x 72mm
Displacement(CC)	418CC
Compression Ratio	20:1 ± 0.5
Fuel Injection Timing	21° ± 1°
Ratedn Power (HP)	8 HP
Max. Power (HP)	9 HP
Rated Speed (RPM)	3600 RPM
Max Torque (NM)	20NM @ 2500RPM
Aspiration	Natural Aspiration
Rotation	Counter clockwise from PTO

CEVPL CONTINUE





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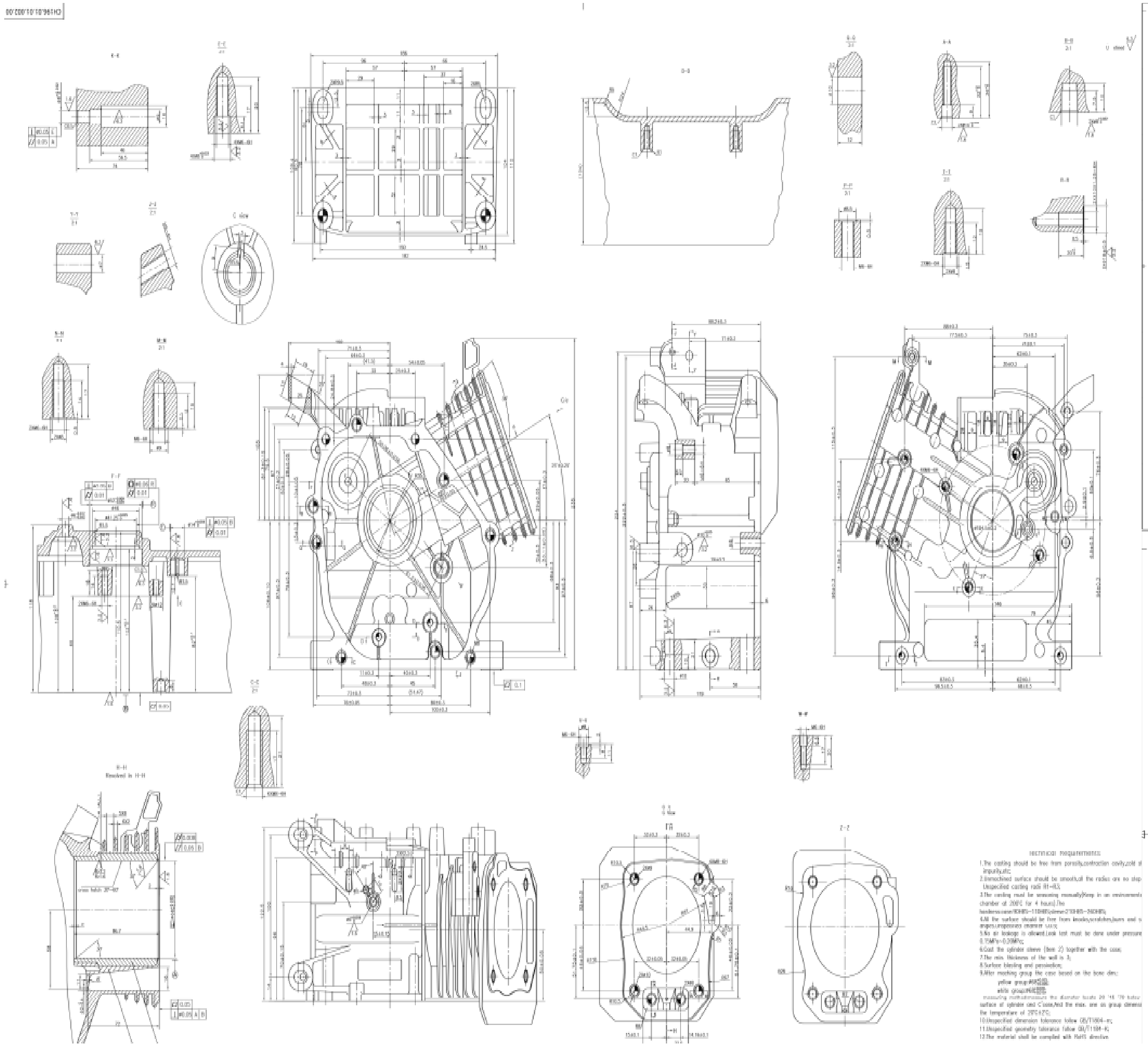
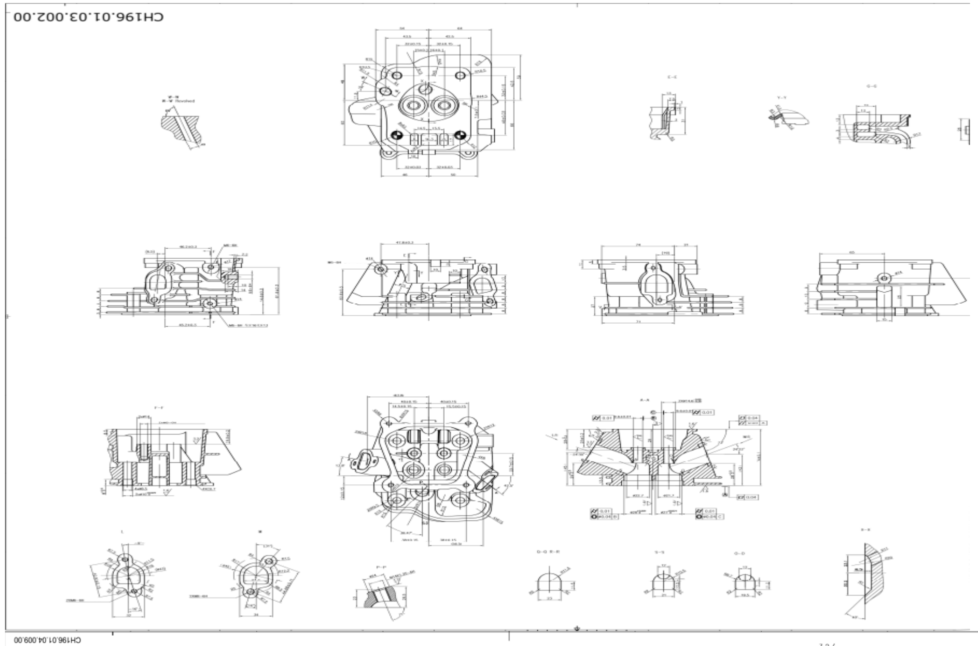
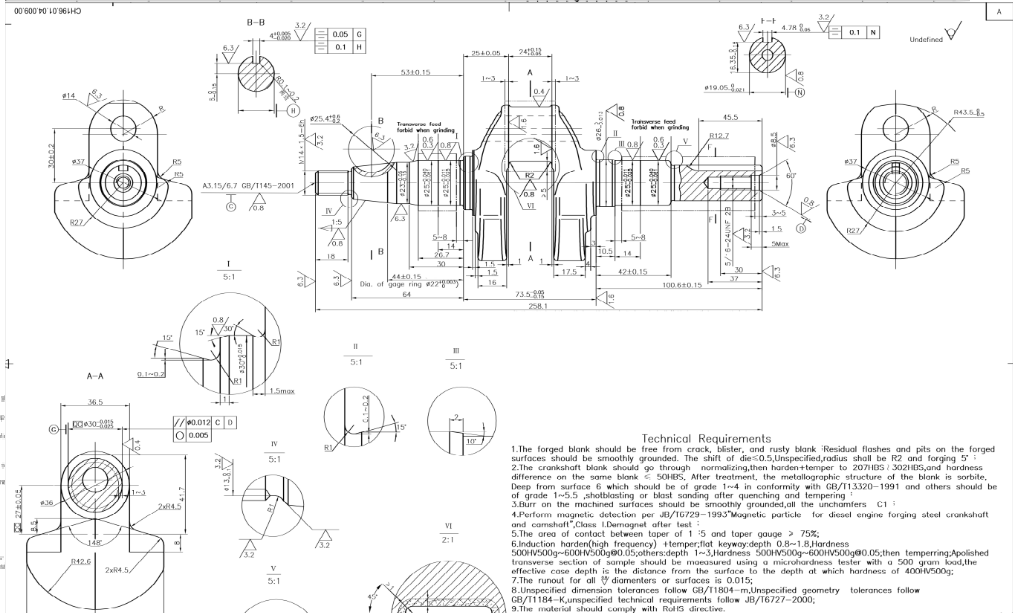






CEVPL CONTINUE

FLOW PROCESS DIAGRAM

Page 1

PART NAME		CC418					
Process No.	Process Name or Operation	Incoming source of variation	Operati	Move	Store	Inspec	Product/Process characteristics
10	**Receipt of material** (material inward)	Qty. / Batch no.		➡			Visual / Material Test Certificate
20	**Inspection of Semi Knock Down Engine & Engine Components**	Dimensional / Visual / Material				■	Dimensional / Visual / Material / Grade
20.1	Cylinder Head Assembly	Dents or scratches and Surface Finish					Gasket and Dowel fitment
20.2	Rocker Cover	Dents or scratches and Surface Finish					De-compression Lever must be free to
20.3	Rocker Lever Assembly	Rocker Jam					Proper Assembly
20.4	Push Rod	Bend					Proper Assembly
20.5	Fuel pump Tappet	Jam					Well Lubricated
20.6	fuel Injection Pump	Rack Jam, Plunger Jam					–
20.7	solenoid						–
20.8	Injector	nozzle hole blocke					–
20.9	Air Extension Pipe	Position of Nut welded on Flange					–
20.10	Air Cleaner						–
20.11	Main cowling	Fly wheel touches to inner surface while rotation					–

Page 2

Process No.	Process Name or Operation	Incoming source of variation	Operati	Move	Store	Inspec	Product/Process characteristics
20.11	Main cowling	Fly wheel touches to inner surface while rotation					–
20.12	Leak Off Pipe						–
20.13	High pressure pipe	Bend, hole blocked by burr					–
20.14	Starter adaptor plate	No damage or crack					–
20.15	Starter Motor	Starter solenoid not operating					–
30	**Cylinder Head Sub Assembly**		●				Proper Assembly
30.1	Valve depth checking					■	valve depth Inlet - 0.30mm Exhaust -
30.2	Valve leakage checking					■	Valve should not leak diesel before 9 sec.
30.3	NTP checking					■	NTP min = 2.7 mm max = 3.0 mm
30.4	Exhaust stud fitment		●				–
40	**Cylinder Head Fitment to Crankcase**		●				–
40.1	Fitment of Studs for Cylinder head . Long Stud - 2 nos Short Stud - 2 nos	Thread Length and Total Length of Studs	●				–
40.2	Dowel and Cylinder Head Gasket, Push Rod Cover rectangular Gasket Fitment		●				–
40.3	Bumping clearance checking					■	0.60 mm to 0.70 mm
40.4	Rocker Assembly		●				–
						■	Insert Shim

Page 3

Process No.	Process Name or Operation	Incoming source of variation	Operati	Move	Store	Inspec	Product/Process characteristics
40.2	Dowel and Cylinder Head Gasket, Push Rod Cover rectangular Gasket Fitment		●				–
40.3	Bumping clearance checking					■	0.60 mm to 0.70 mm
40.4	Rocker Assembly		●				–
40.5	Tappet Setting					■	Insert Shim Inlet - 0.10 mm Exhaust - 0.10 mm
50	**Fuel pump Sub Assembly**		●				–
50.1	Solenoid lower body Fitment to Fuel Pump		●				apply Locktite 243
50.2	Solenoid Fitment to Solenoid Lower Body		●				–
60	**Fuel Pump Assembly on Crankcase**		●				–
60.1	Insert Fuel Pump barrel	rust, scratches, surface finish	●				rust free, smooth surface finish
60.2	Insert Copper Washer		●				0.1 mm / 0.2 mm
60.3	Fitment of Entire Fuel Pump Sub Assembly	rack jam	●				By moving speed control lever check free
60.4	Fuel Time Checking					■	17°±1 , adjust shim accordingly - 0.1, 0.2, 0.3, 0.5 mm
70	**High Pressure pipe fitment**	Hole blocked by burr, Bend	●				Torque 30 – 35Nm, Should not over tight or
80	**Leak off pipe fitment**	hole block, Cotton braided insulation not proper	●				Should not over tight or mis any copper
90	**Main cowling fitment**	Fly wheel touches to inner surface while rotation	●				Position of Bidding must be proper tight fitted

Page 4

CEVPL CONTINUE

Type rating test report		418 Engine Endurance test Report								art Date	26.02.2018
as per IS:11170:1985/10001:1982										Altitude	60 meter
Type	CH	Engine Sr. No.	13-02-003	Apply. Code		Fuel Sp. Gravity		Oil sp. Gravity		BED NO.	3
No. of Cylinder	1	Brake Power hp /	6 / 4.4	Rated rpm	3600	Declared SFC	1 gms\kw	Barometer Readi	MM of	Dynamometer Ty	Electrical
Bore	82 MM	Stroke	66 MM	Compression Ra	20:1	Bulb capacity in c	25	Air Cleaner Type	l Bath ty	Dynamometer Co	9549.3
Mechanical Efficiency	80%	Engine Cooling	AIR	Fuel Timing	17 Deg	Fuel Pump Make	mico			Lub oil used	20W40

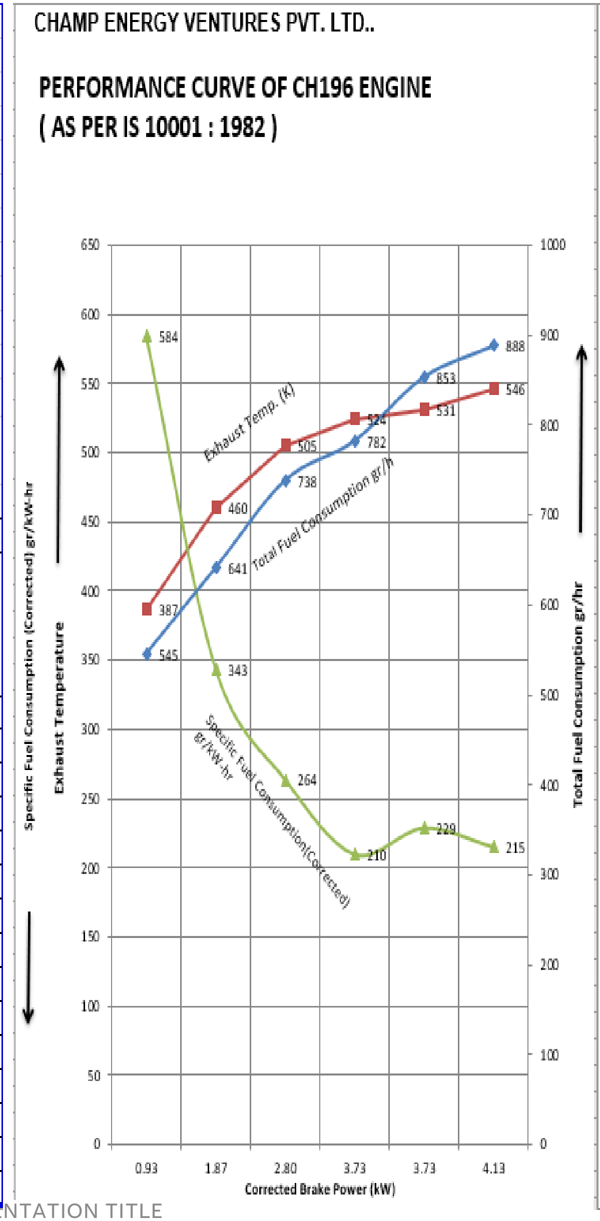
S.No.	Date	Time	Load in %	Dry Bulb Temp.	Wet Bulb Temp.	Air In Temp.	Brake Load in Nm	Measured RPM	Brake Power (Measured) in kw	Correction factor for Power	Brake Power Corrected in (KW)	Time for 50 cc in sec.	Total Fuel Consumption (Observed)	Observed SFC in grs./kw. hrs.	Correction factor for SFC	SFC Corrected in grs. / kw. Hrs	Exhaust Temp. in Deg. C	Cr.case Pr. mm of H_2O	Exhaust Back Pr. mm of H_2O	Lube Oil Pr. in (Kg/cm2)	Lube Oil Temp. in (Deg C)	oke in bo	Remark
Cycle 26		6.00 AM																					
409	6.4.2013	7.00 AM	100%	24	19	25	11.1	3604	4.2	0.9449	4.4	131.4	1144	273	1.0087	271	460	-130	40	4.3	88	2.356	
410	7.4.2013	8.00 AM	100%	26	21	27	11.1	3608	4.2	0.9392	4.5	125.6	1197	285	1.0096	283	369	-135	35	4.2	89	2.072	100 ml Oil top up done.
411	6.4.2013	9.00 AM	100%	28	21	29	11.1	3598	4.2	0.9383	4.5	134.0	1122	268	1.0098	266	440	-135	30	4.1	90	3.235	
412	6.4.2013	10.00 AM	100%	31	22	32	11.1	3599	4.2	0.9364	4.5	130.0	1156	276	1.0101	274	470	-130	30	3.8	95	2.678	
413	6.4.2013	11.00 AM	50%	34	23	35	5.4	3636	2.1	0.9300	2.2	192.4	781	380	1.0112	376	242	-130	30	4.4	85	1.650	
414	6.4.2013	12.00 AM	50%	35	24	36	5.4	3635	2.1	0.9280	2.2	191.8	784	381	1.0116	377	245	-130	35	4.0	87	1.373	
415	6.4.2013	1.00 PM	50%	37	24	38	5.4	3631	2.1	0.9241	2.2	192.2	782	381	1.0122	376	247	-130	30	4.0	88	1.483	
416	6.4.2013	2.00 PM	50%	38	26	39	5.4	3632	2.1	0.9223	2.2	192.2	782	381	1.0126	376	246	-130	30	4.0	89	1.502	
417	6.4.2013	3.00 PM	110%	39	26	40	12.1	3600	4.6	0.9204	5.0	127.4	1180	259	1.0129	255	328	-135	35	3.4	100	1.820	
418	6.4.2013	3.30 PM	0%	36	25	37	0	3656	-	0.9261	-	294.4	511	-	1.0119	-	178	-130	30	4.6	89	0.436	
419	6.4.2013	4.30 PM	100%	35	24	36	11.1	3606	4.2	0.9280	4.5	119.8	1255	299	1.0116	296	325	-145	35	3.6	98	2.639	
420	6.4.2013	5.30 PM	100%	35	24	36	11.1	3608	4.2	0.9280	4.5	120.8	1244	297	1.0116	293	318	-145	35	3.7	96	2.901	
421	6.4.2013	6.30 PM	100%	33	23	34	11.1	3504	4.1	0.9321	4.4	120.4	1248	306	1.0108	303	314	-130	35	3.8	93	3.026	
422	6.4.2013	7.30 PM	50%	31	23	32	5.4	3640	2.1	0.9364	2.2	193.8	776	377	1.0101	373	230	-125	30	4.3	86	0.992	
423	6.4.2013	8.30 PM	50%	29	24	30	5.4	3637	2.1	0.9306	2.2	194.0	775	377	1.0111	373	227	-120	30	4.5	84	1.160	
424	6.4.2013	9.30 PM	50%	28	22	29	5.4	3637	2.1	0.9383	2.2	198.4	758	368	1.0098	365	221	-120	30	4.5	83	1.138	
425	6.4.2013	10.00 PM	50%	27	22	28	5.4	3638	2.1	0.9363	2.2	192.8	780	379	1.0101	375	214	-125	30	4.6	80	0.842	

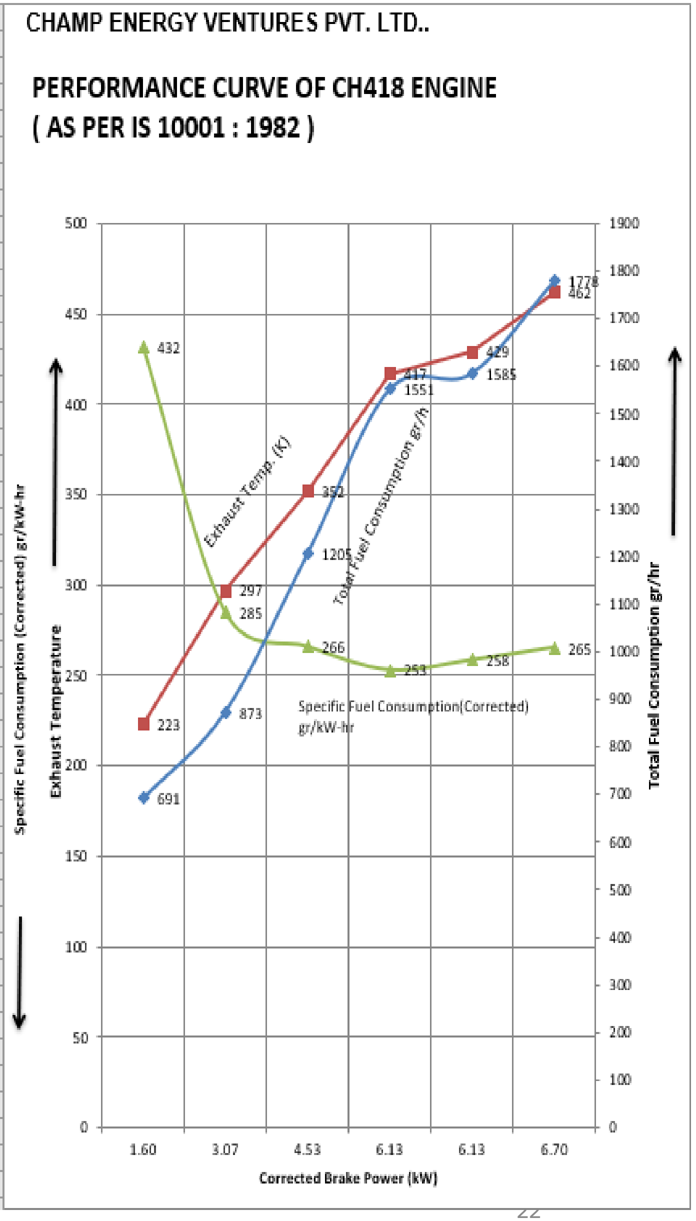
Total Running Hrs	416

CEVPL CONTINUE

TESTING OF CONSTANT SPEED IC ENGINES FOR GENERAL PURPOSE IS:10001			
12 Hour Rating Test As Per IS:10000 Part-VIII Clause 2.1.3			
Name of the Engine Manufacturer			
Type:	Air Cooled	Sheet No.	1 of
Model:	CH 196	Altitude(m)	560
Engine No.		Nominal Compression Ratio :	20:01
No.of Cyl. :	1	Fuel Specification :	
Rated Speed(n) rev/min :	3600	Calorific value :	42000 KJ/KG
Rated Brake Power (P) kW:	5.5	Manufacturer's recommended Grade of Oil:	
Bore 86 mm; Stroke **72 mm**		Dynamometer Type :	Electric Dynamometer
Cubic Capacity Litres		Specific Gravity	0.81 gm/mm3
Mechanical Efficiency(η_m) :	80%		
Place of Test:	Pune	Date:	
Testing Laboratory:	Champ		
Observers:			

Sl.No.	Time	Temperatures: Wet Bulb °C	Temperatures: Dry Bulb °C	Temperatures: Air Intake °C	Temperatures: Exhaust Gas °C	Exhaust Back Pressure (mm H2O)	Relative Humidity (φ)	Engine Speed (RPM)	LOAD Dyno. Output (KW)	Calculated Torque (N-M)	Calculated Power (KW)	Fuel Consumption: Fuel Consumed g	Fuel Consumption: Fuel Consumption Time	Fuel Consumption: Fuel Consumption Rate	Fuel Consumption: Specific Fuel Consumption	Lubricating Oil: Temp °C	Lubricating Oil: Pressure (bar)
1	2	4	5	6	7	8	9	10	11	12	13	15	18	19	20	23	24
1	6:00	40	41	300	660	--	76	3010	0.7	2.8	0.8667	36	290	503	580	400	6.86
2	7:00	298	301	303	661	--	75	3012	1.3	5.5	1.7333	36	275	530	306	500	6.5
3	8:00	299	302	304	665	--	73	3008	2.0	8.3	2.6000	40.5	260	561	216	550	6
4	9:00	300	303	305	668	--	71	3009	2.6	11.0	3.4667	40.5	200	729	210	560	5.6
5	####	300	303	306	670	--	68	3015	2.9	12.1	3.8133	40.5	150	972	255	570	5.23
6	11:00	300	304	307	673	--	65	3018	3.0	12.8	4.0400	40.5	140	1041	258	590	4.7
7	####	302	307	310	674	--	63	3014	3.5	14.8	4.6667	40.5	130	1122	240	600	4.9
8	1:00	305	308	311	677	--	61	3012	3.7	15.6	4.9333	40.5	110	1325	269	610	4.8
9	2:00	306	309	312	679	--	60	3010	3.8	16.1	5.0667	40.5	103.5	1409	278	620	4.9
10	3:00	307	310	313	683	--	62	3014	3.9	16.5	5.2000	40.5	103.6	1407	271	63	4.8
11	4:00	306	309	312	682	--	63	3020	4.0	16.9	5.3333	40.5	98	1488	279	650	4.9
12	5:00	304	307	310	680	--	63	3018	4.2	17.7	5.6000	40.5	90	1620	289	660	4.8
13	6:00	301	304	307	709	--	65	3015	4.4	18.6	5.8667	40.5	88	1657	282	670	4.3





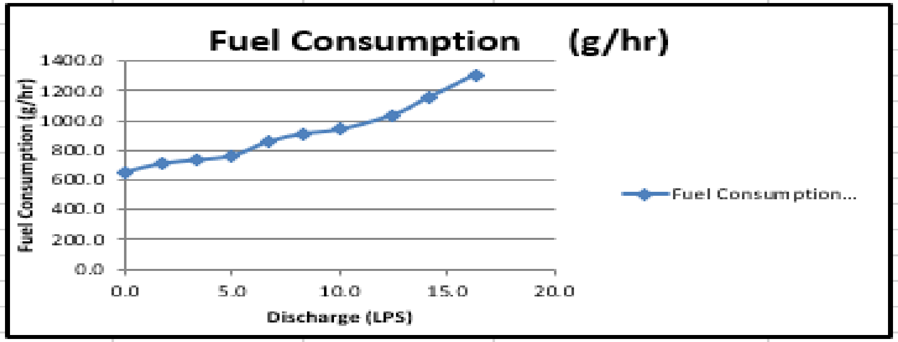
CEVPL CONTINUE

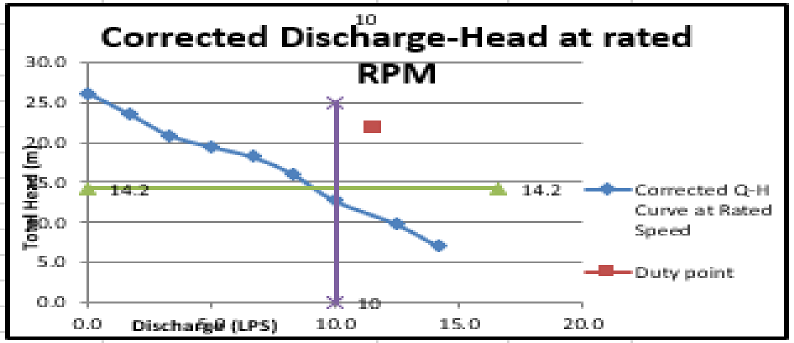
PUMP TEST RECORD SHEET

IS : 11501

Engine Details		Pump Details.			Date
Engine Model	CH196	Name /No.	Self Priming_3" x 3"		13.02.2018
Engine No.		Rated Duty Point		Actual Duty Point :	
Type.	Air Cooled single Cly. Petrol Engine	Discharge (LPS):	11.5	Discharge	10
HP/kW	5.0/3.7	Head (mtr):	22	Head	14.2
SPEED(RPM)	3600	Rated Discharge Ran	05- 14 LPS		
FUEL TANK CAPACITY	2.5	Rated Head Range	09-22		
		Efficiency	60 % (APPROX)		
SFC	262gm/hp-hr	PIPE SIZE (SUC)MM	80 mm		
		PIPE SIZE (DEL)MM	80 mm		

S.No.	Measured Engine RPM	Discharge (LPM)	Discharge (LPS)	Corrected Discharge at Rated Engine RPM	Suction Gauge Meter Reading	Delievery Gauge Meter	Center Distance Between Pump Suction Pipe to Delivery	Velocity Correction (Mtr)	Total Head	Corrected Head at rated RPM	Time in Second	Fuel Consumption (g/hr)
1	3626	0	0.0	0.0	0.4	25	1.03	0.13	26.56	26.2	230	653.5
2	3609	100	1.7	1.7	0.6	22	1.03	0.13	23.76	23.6	212	709.0
3	3607	200	3.3	3.3	0.8	19	1.03	0.13	20.96	20.9	205	733.2
4	3601	300	5.0	5.0	0.8	17.5	1.03	0.13	19.46	19.4	197	762.9
5	3596	400	6.7	6.7	1	16	1.03	0.13	18.16	18.2	175	858.9
6	3603	500	8.3	8.3	1.1	13.8	1.03	0.13	16.06	16.0	165	910.9
7	3602	600	10.0	10.0	1.6	10	1.03	0.13	12.76	12.7	160	939.4
8	3606	750	12.5	12.5	1.8	6.9	1.03	0.13	9.86	9.8	145	1036.6
9	3600	850	14.2	14.2	1.9	4	1.03	0.13	7.06	7.1	130	1156.2
10	3605	980	16.3	16.3	2	2	1.03	0.13	5.16	5.1	115	1307.0





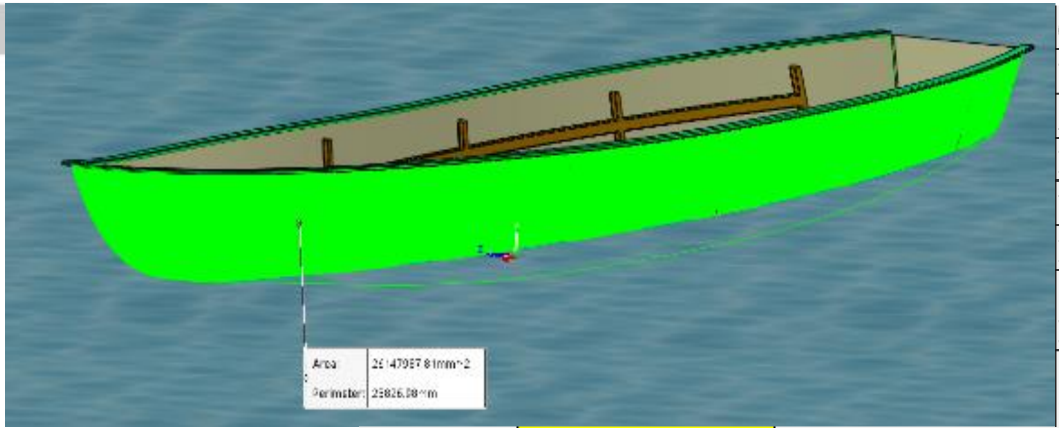
Pump Certified for:

a) Total Head in mtr. : ------------------------------b) Discharge in L/s : --------------------c) Fuel Consuption in g/Hr. : ----------------------

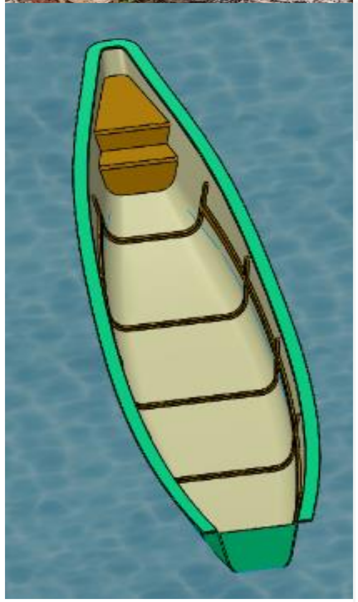
Rev / min. : ----------------------------Set Started at: ----------------------------Set stopped at :-------------------------

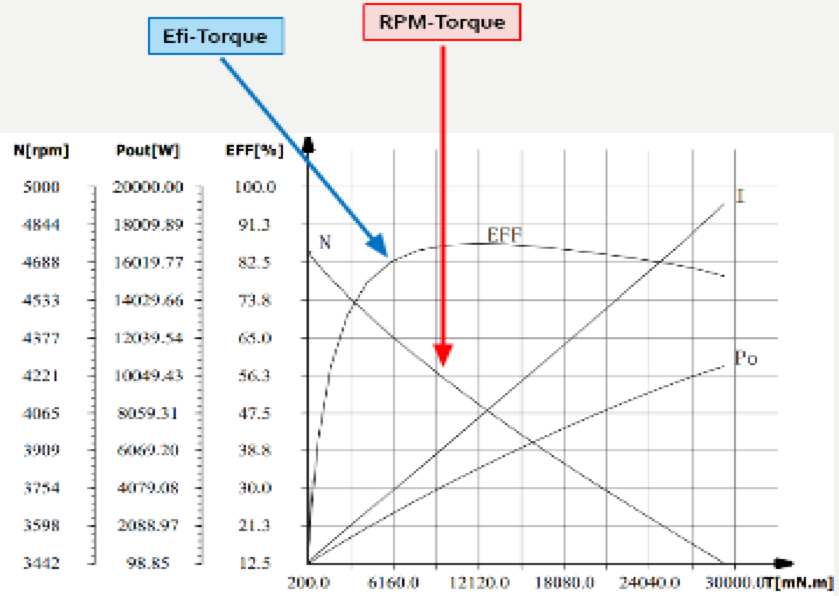
General requirements : Satisfactory / unsatisfactory Remarks :---

ELECTRIC CANOE DESIGN POSITION, SOLAR CANOES AGAINST DEFORESTATION (SCAD) PROJECT



Gravity (m/s^2)	9,81
Water density (kg/m^3)	1014
Air density (kg/m^3)	1,225
Mass boat, people, batteries, etc. (kg)	2000
Weight (N)	19620
L (m)	12,7
Kinematic viscosity (m^2/s)	0,898E-06
Speed (m/s) 17km/h	4,72

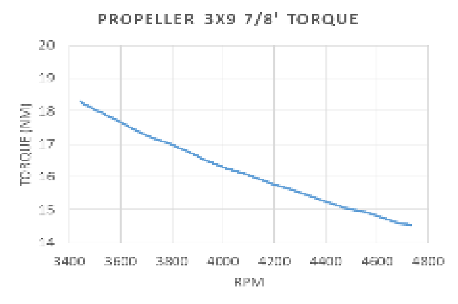


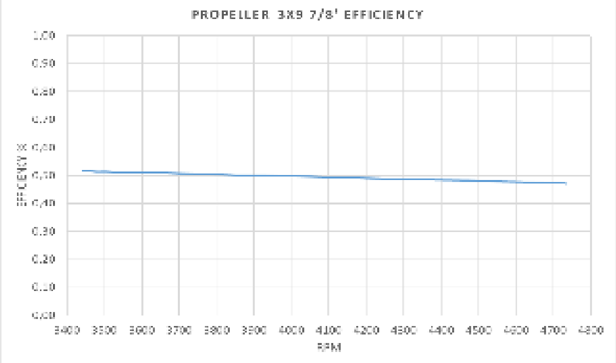


Propeller variables	
Diameter (inches)	9 7/8
Diameter (m)	0,2508
Radius (m)	0,125413
Disc area (m^2)	0,0494
Number of blades	3
Water density (kg/m^3)	1014
V (km/h)	17
V (m/s)	4,72
Thrust (N)	720,28

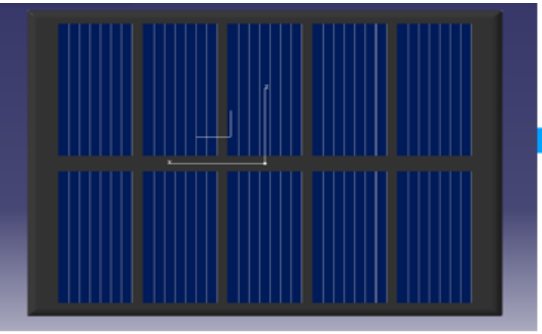
Propeller 3x9 7/8

Rpm	n (rev/s)	Coef Thrust	Coef Power	Power (kW)	Torque (Nm)	Efficiency
3442	57,37	0,0545	0,0847	6,59	18,30	0,5158
3455	57,58	0,0541	0,0843	6,59	18,22	0,5159
3466	57,77	0,0538	0,084	6,60	18,18	0,5155
3478	57,97	0,0534	0,0837	6,61	18,14	0,5147
3492	58,20	0,0530	0,0833	6,61	18,07	0,5147
3507	58,45	0,0525	0,0829	6,61	18,01	0,5143
3525	58,75	0,0520	0,0825	6,63	17,97	0,5127
3547	59,12	0,0514	0,0819	6,63	17,86	0,5127
3581	59,68	0,0504	0,0811	6,66	17,75	0,5110
3634	60,57	0,0489	0,0298	6,67	17,51	0,5108
3707	61,78	0,0470	0,0282	6,70	17,25	0,5080
3785	63,08	0,0451	0,0267	6,75	17,02	0,5041
3855	64,25	0,0435	0,0254	6,78	16,80	0,5015
3931	65,52	0,0418	0,024	6,79	16,51	0,5006
4013	66,88	0,0401	0,0227	6,84	16,27	0,4975
4091	68,18	0,0386	0,0216	6,89	16,08	0,4935
4183	69,72	0,0369	0,0208	6,92	15,81	0,4912
4282	71,37	0,0352	0,0191	6,99	15,59	0,4867
4382	73,03	0,0336	0,0179	7,02	15,30	0,4846
4475	74,58	0,0323	0,0169	7,06	15,06	0,4819
4563	76,05	0,0310	0,0161	7,13	14,92	0,4771
4636	77,27	0,0301	0,0154	7,15	14,73	0,4756
4690	78,17	0,0294	0,0149	7,16	14,59	0,4748
4720	78,67	0,0290	0,0147	7,20	14,58	0,4721
4731	78,85	0,0289	0,0146	7,21	14,54	0,4721
4733	78,88	0,0288	0,0146	7,21	14,56	0,4715

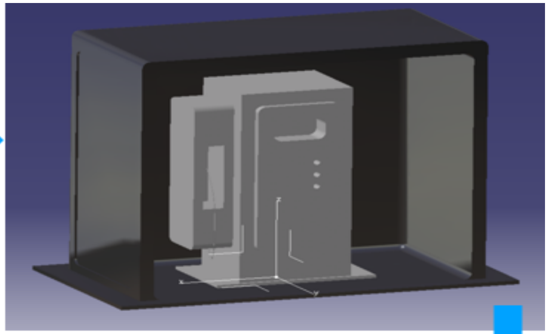




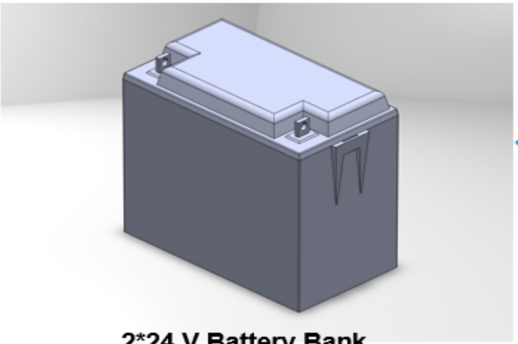
(SCAD) PROJECT-CONTINUE



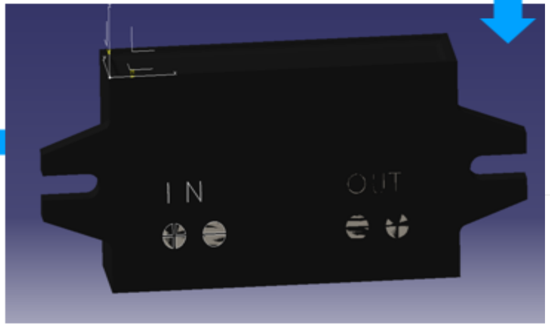
Solar Panels-56V 200A >6800W



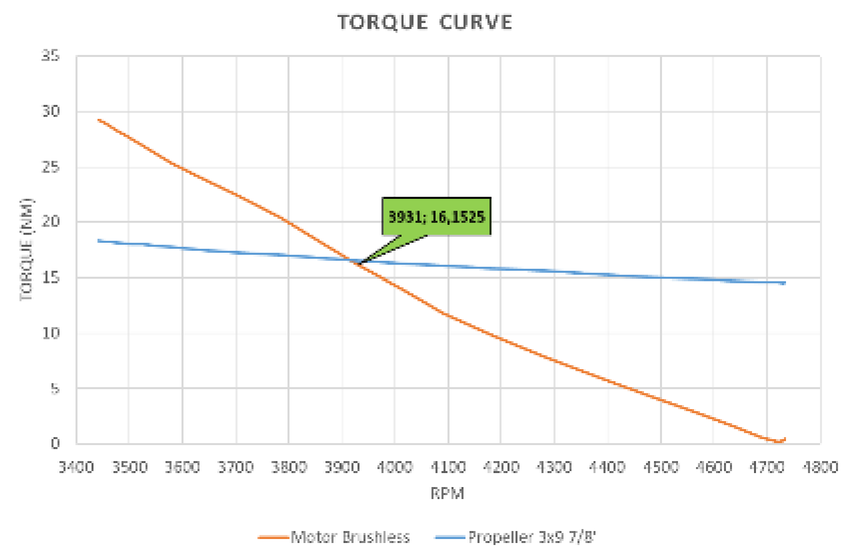
Charging Controller



2*24 V Battery Bank

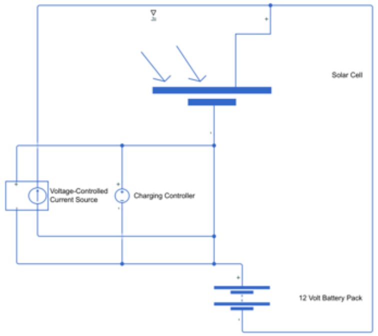


Converter: 48-24 Volts Direct Current



Intersection Point	
RPM	Torque (Nm)
3931	16,51
n (rev/s)	65,52
Power (kW)	6,80
Coef. Power	0,024007
Thrust (N)	720,28
% Power Used	68,0
Motor Effi (%)	0,864
Propeller Effi (%)	0,5006

1) We are looking to charge a 2*24V 5KWh 100A battery with following specifications-
a) Max Continuous Discharge Current: 100A-200A,
b) BMS discharge current cutoff- 32V, BMS discharge Voltage cutoff- 62.4V.
c) Reconnect Voltage 38V,
d) End of charge-58.4V,
e)Solar panels should be compatible for wiring in series,
f) Boat application Max motor specifications- 10KW.
2) Recommended Charge Range- >56V.
3) Recommended Charge Current- 48-100A (Max Charge Current 100A).
4) Efficiency above 21%. The higher the per cell efficiency the better (Usually it should be in the standard range of 22.5-25%).
Note-As efficiency increases the cost of solar panels will increase too.
5) Waterproof MC connectors (must), Should come with a flush power cable as we are gonna utilize it for marine applications.
6) Panels should be durable, Should support MPPT charge controllers.
7) Anti corrosive frame and should be waterproof (ip 67). Plus if it's anti-dust and anti-slippery (Will be easy for cleaning and maintenance).
8) Hot-spot heating should be avoided at all costs.
9) Compatible with on-grid and off-grid inverters.
10) EL-tested solar modules if possible.
11) Mounting Holes/brackets with support for different Z-Brackets, Pole Mounts, and Tilt Mounts.



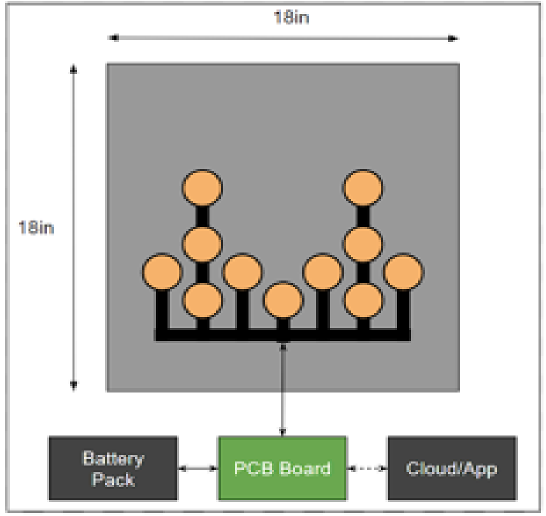
Simulink Model For Whole System

Sella Rotalis

Mangirish Kulkarni, Trenton Clark, Shubang Mukund, Kaustubh Nalawade.

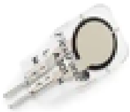
Sensor placement

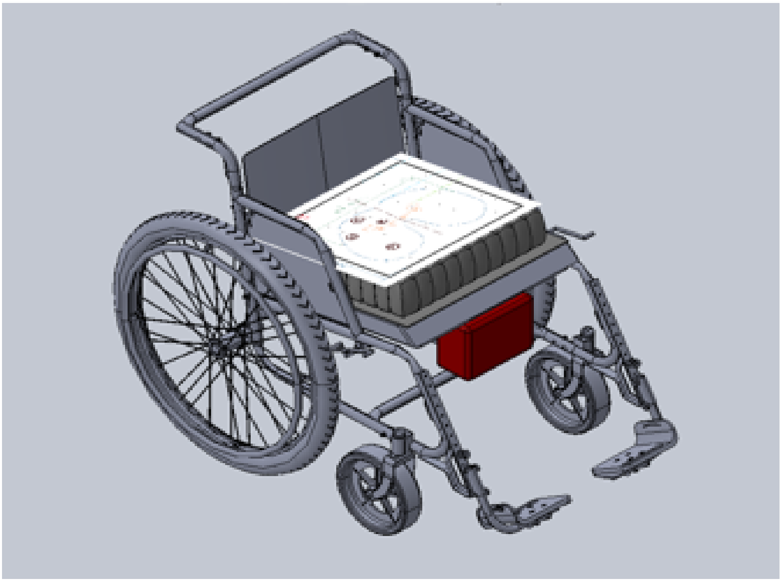
Sensor placement and arrangement is important problem for properly measuring likely locations for pressures sores. Most likely locations for pressure sores are the tailbone and the pelvis. There for Force-Sensitive Resistors are placed around the location where the users tailbone and pelvis would be located.



Force-Sensitive Resistors

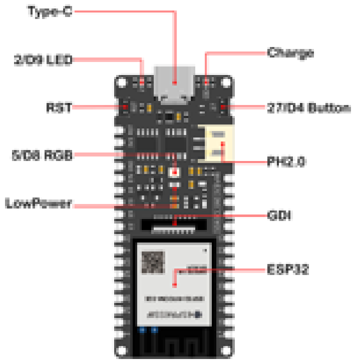
Force-sensitive resistors (FSR) is a material whose resistance changes when the force, pressure or stress is applied. They were chosen as the most optimal choice to measure the weight. A301-25 was used as it allow for a large range of force values.





ESP 32

ESP 32 is a low cost programmable microcontroller that allows for wifi and bluetooth connections. DFR0654 was used as it was cheap and and was compatible with the arduino code base. ESP 32 would connect analog values from the FSR to a shift register allow for a few digital output pins to be used.



Housing

- The design is modeled in Solidworks and the casing is 3D printed with PLA material.
- This housing implements ESP 32, Battery, other hardware and wiring.

Program

The programming used is basic arduino, HTML and C programming to integrate the application in the form of an HTML page using HTTP protocol and the sensor data inputted to the arduino ESP32 , convert the values to digital output in Pounds and show the pressure sensed by each sensor to the user.

Source

Cuddigan J, Frantz RA. Pressure ulcer research: pressure ulcer treatment. A monograph from the National Pressure Ulcer Advisory Panel. Advances in Wound Care : the Journal for Prevention and Healing. 1998 Oct;11(6):294-300; quiz 302. PMID: 10326348.

https://www.digikey.com/en/products/filter/force-sensors/531?s=[illegible]

THANK YOU

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