MECHANICAL ENGINEERING PORTFOLIO:

DEVANSH RAJ MISHRA

FINITE ELEMENT ANALYSIS DESIGN:
DESIGN AND FEA MODELING OF A CHICK EMBRYO

Project Title:- Chick Embryo Finite Element Analysis

Aim:- To design and perform Finite Element Analysis (FEA) of a model chick embryo to analyze torsion and flexion during growth. The torsion and flexion during growth is a potential cause for congenital heart disease.

Result:- An Embryo with and without the membrane was designed. It includes the addition of growth elements and runs as a finite model.

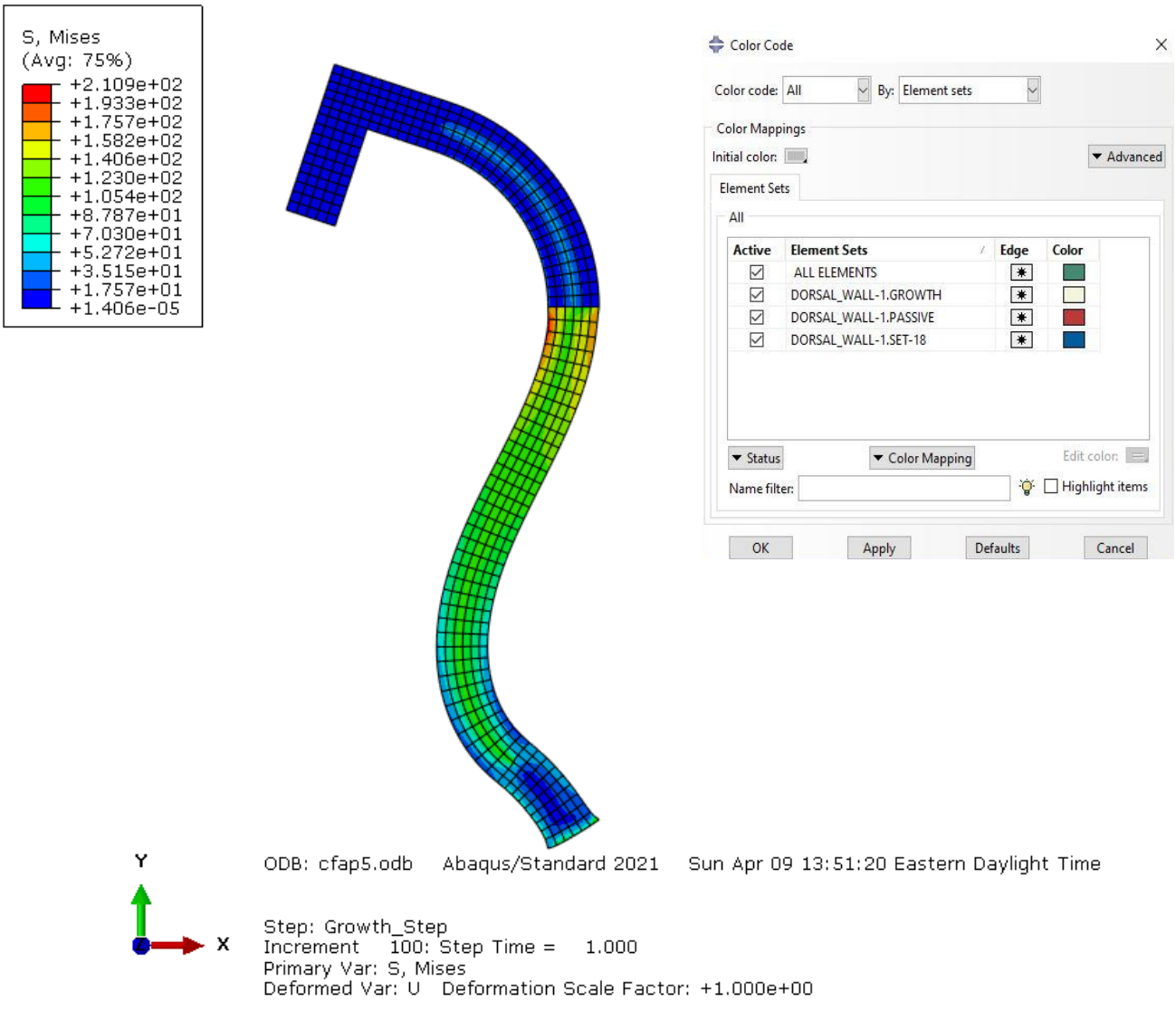


Figure 1. FEA performed on model Embryo

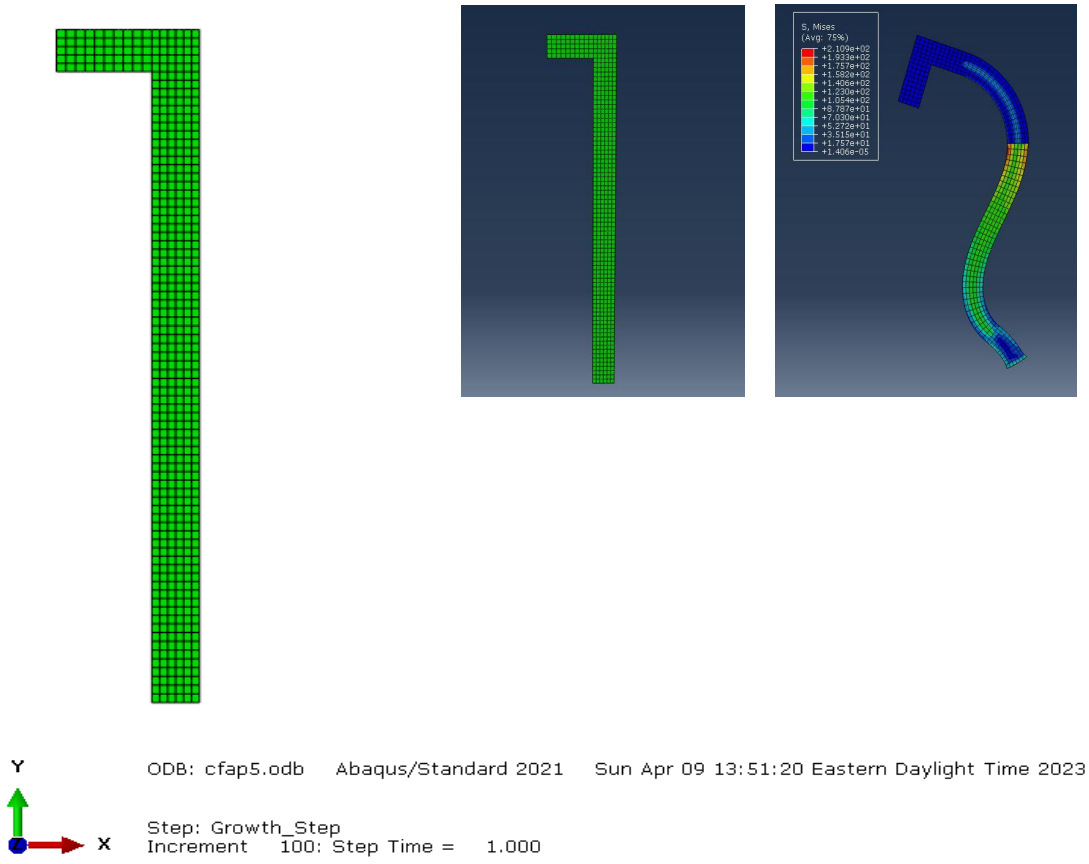
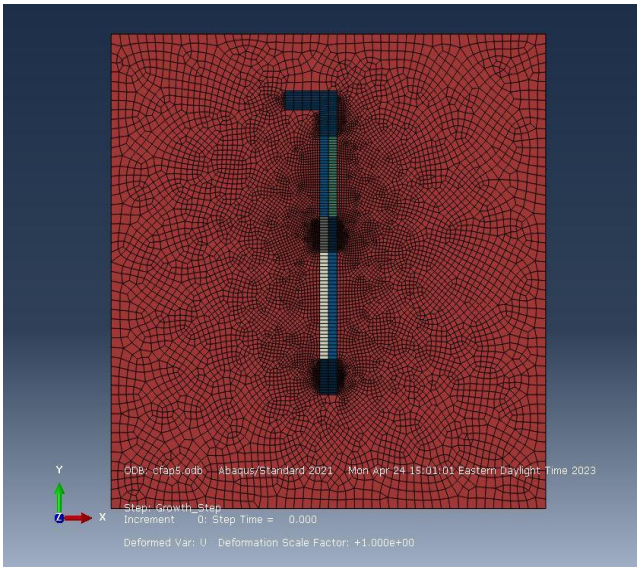


Figure 2. Model Embryo prior to FEA

Figure 3. Real life embryo modeled



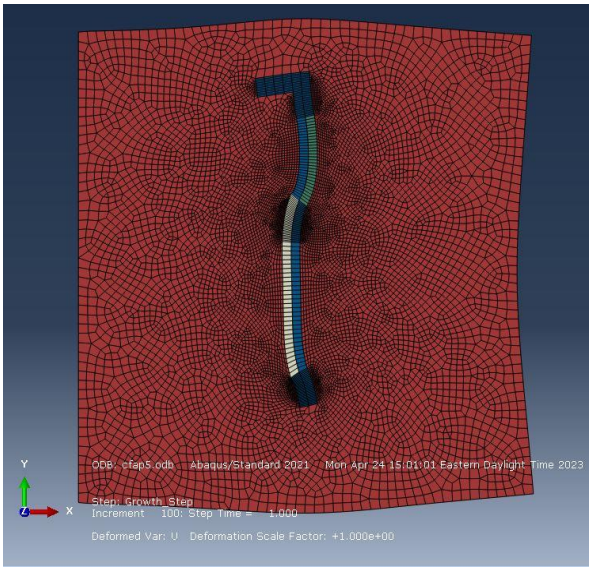
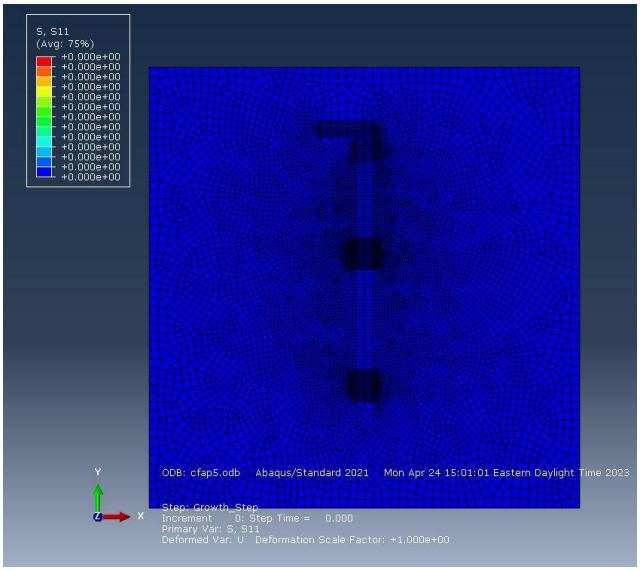


Figure 4. Embryo modeled inside a membrane



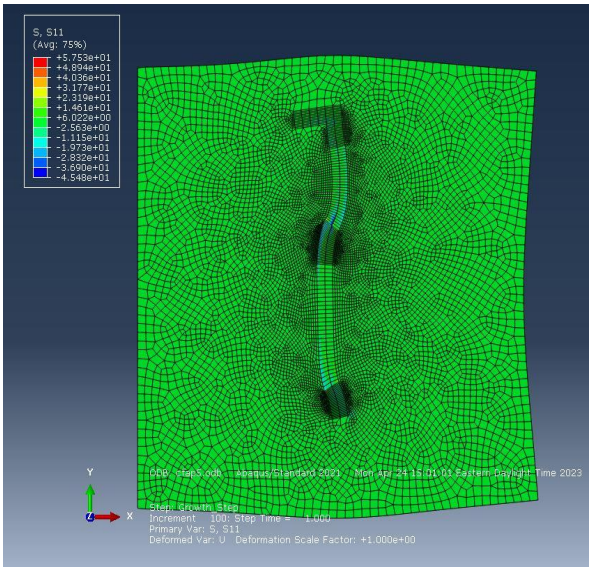


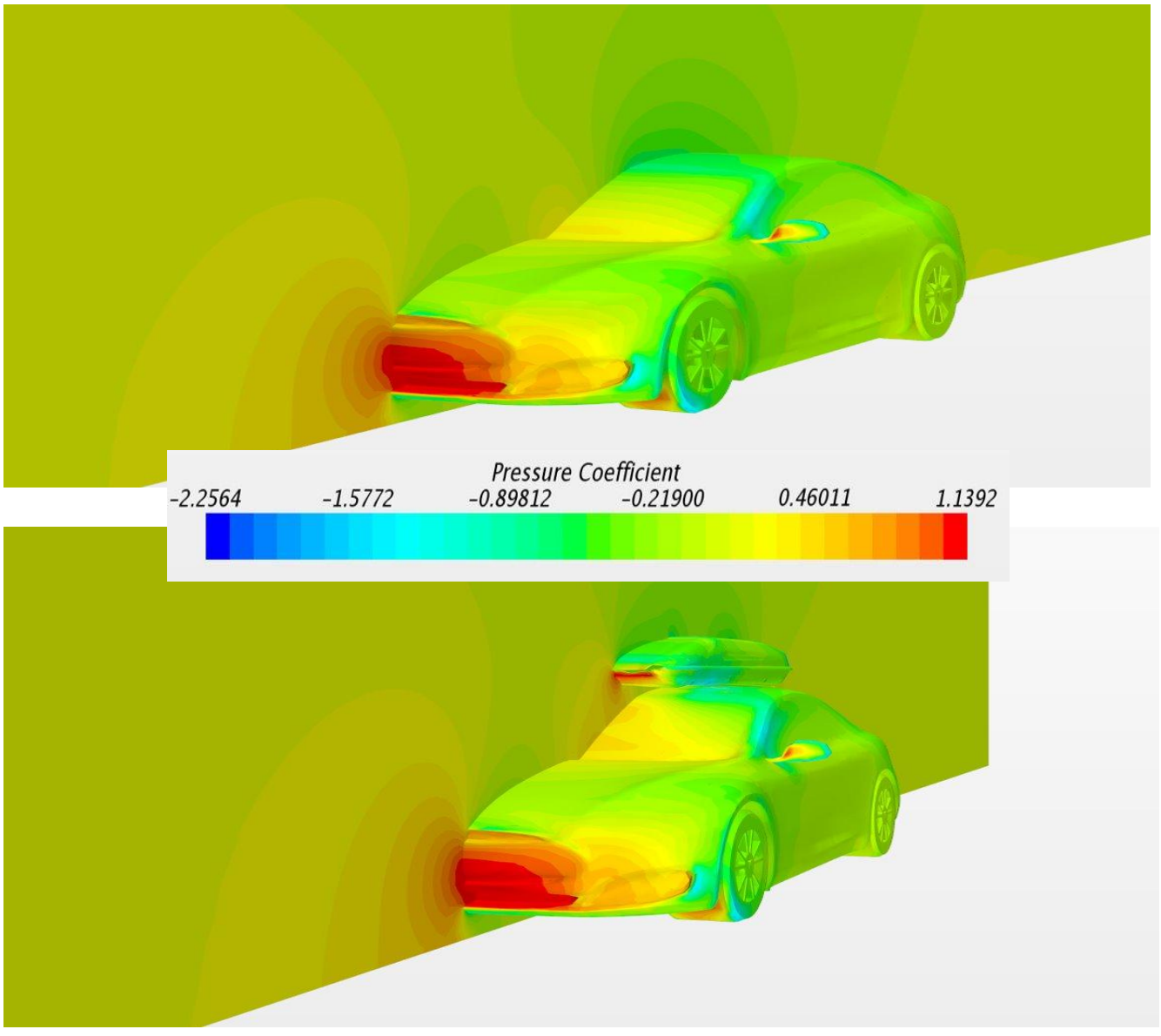
Figure 5. Job analysis results of complete embryo

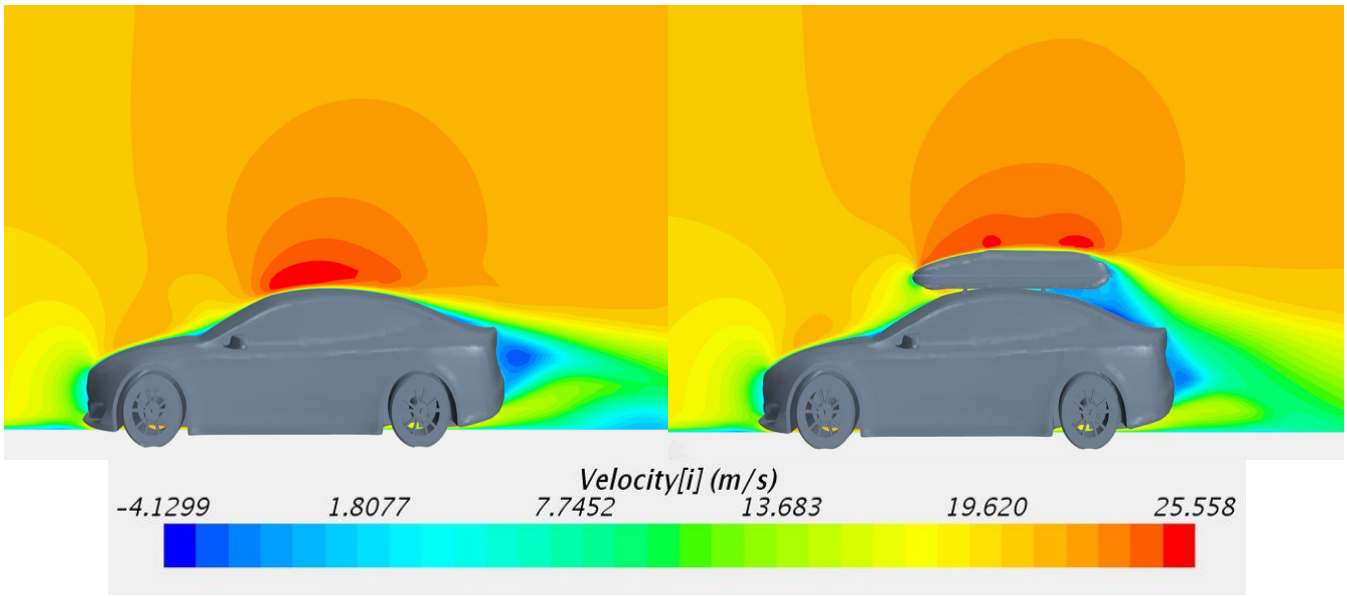
COMPUTATIONAL FLUID DYNAMICS:
TESLA MODEL S AERODYNAMICS ANALYSIS

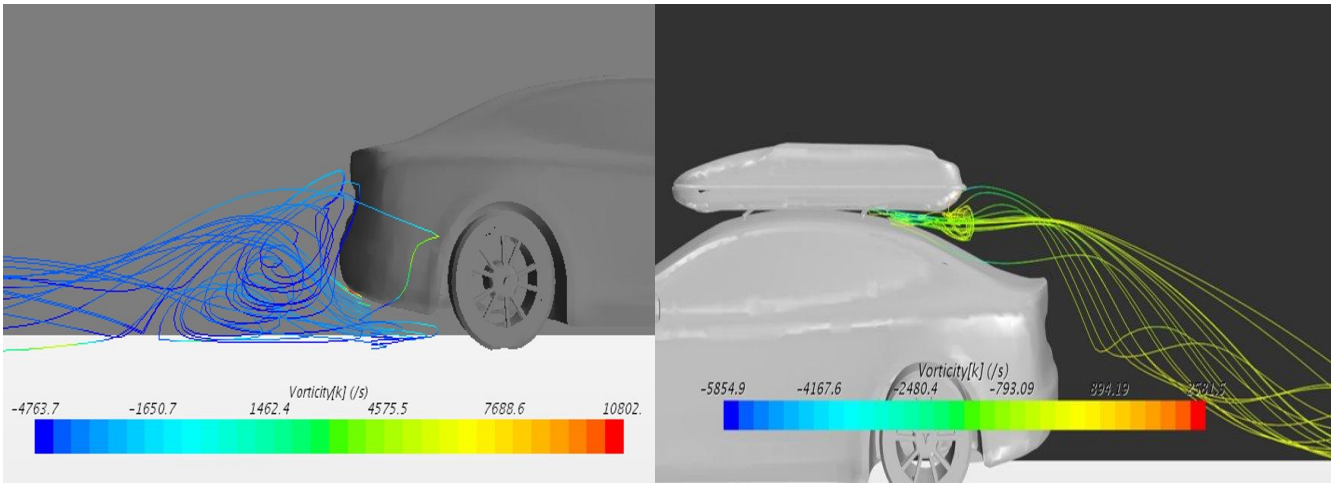
Project Title:- CFD analysis of a model Tesla model S (with ski box)

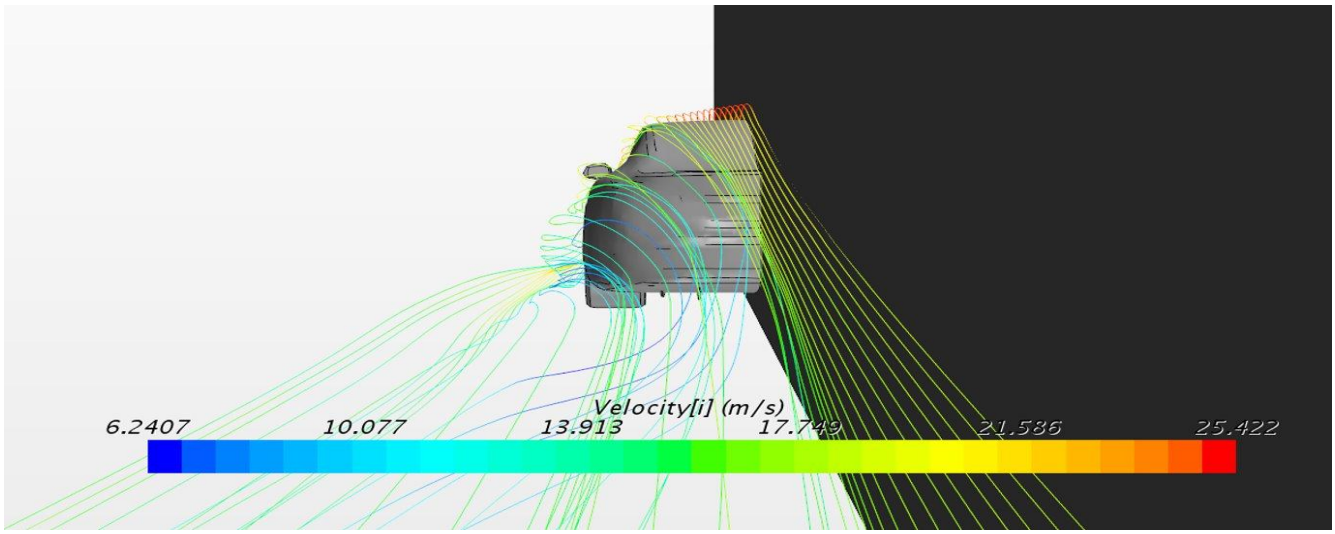
Aim:- Experimentally measure aerodynamic quantities for a Tesla model S using Star CCM+ CFD analysis. Investigate and analyze wind speed and pressure distribution along the vehicle surface. Compare results with modified model with a ski box attached to the roof

Result:- A complete CFD was performed and Coefficient of Drag, Lift and Pressure was calculated. A velocity field analysis was also performed.




Velocity[i] (m/s)
-4.1299
1.8077
7.7452
13.683
19.620
25.558


Vorticity[k] (/s)
-4763.7
-1650.7
1462.4
4575.5
7688.6
10802.
Vorticity[k] (/s)
-5854.9
-4167.6
-2480.4
-793.09

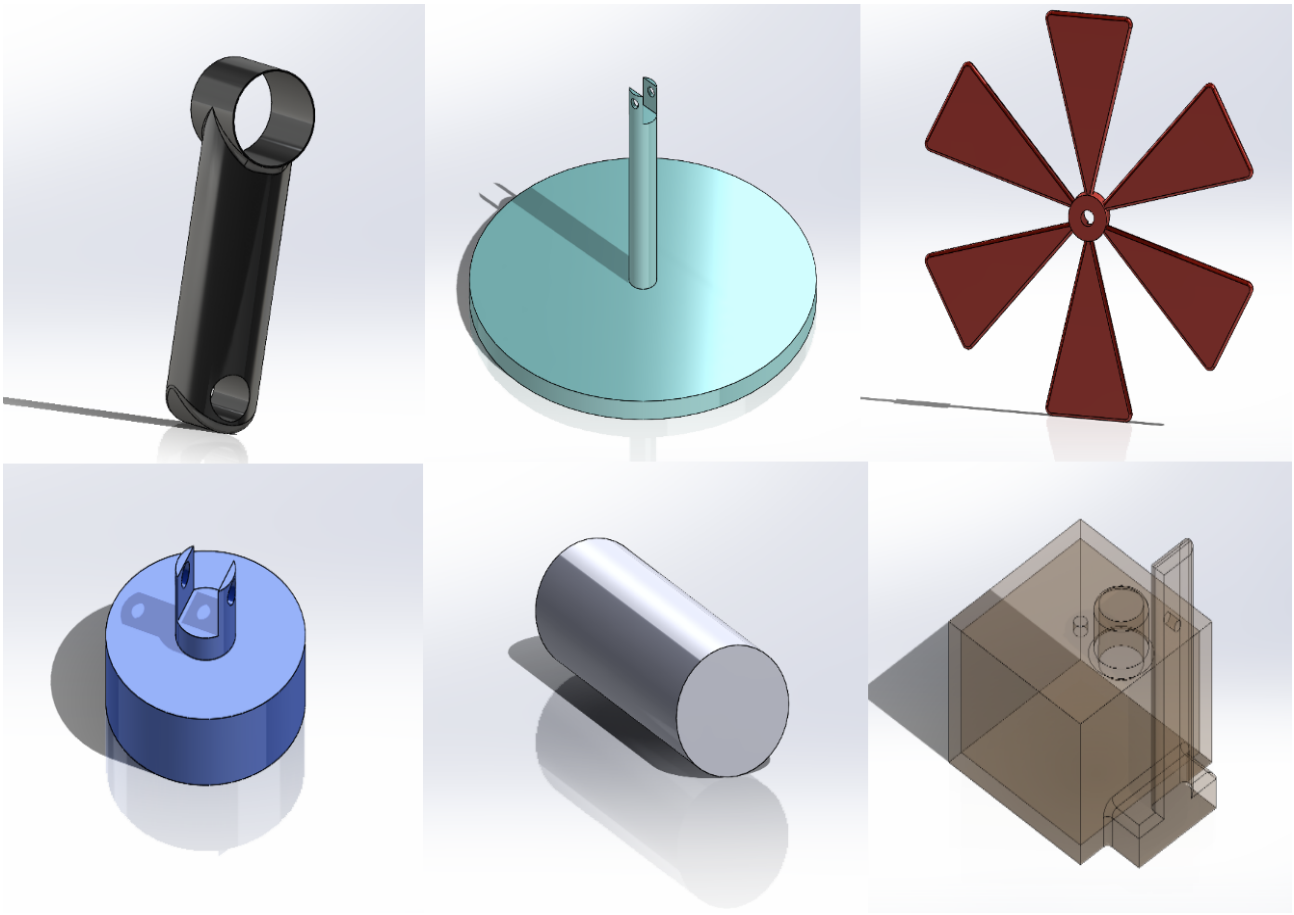

Velocity[i] (m/s)
6.2407
10.077
13.913
17.749
21.586
25.422

PROJECT DESIGN:
DESIGN AND ASSEMBLY OF A CRANK ENGINE

Project Title:- Crank Engine

Aim:- To design and create components of a Boxed Crank Engine and assemble the final product (including Drawings).

Result:- A complete Crank Engine Box was designed including the assembled product and Drawings and Presentable Rendering with motion analysis.



The above figures are the components created and used for the main assembly of the Crank Engine using Solidworks.

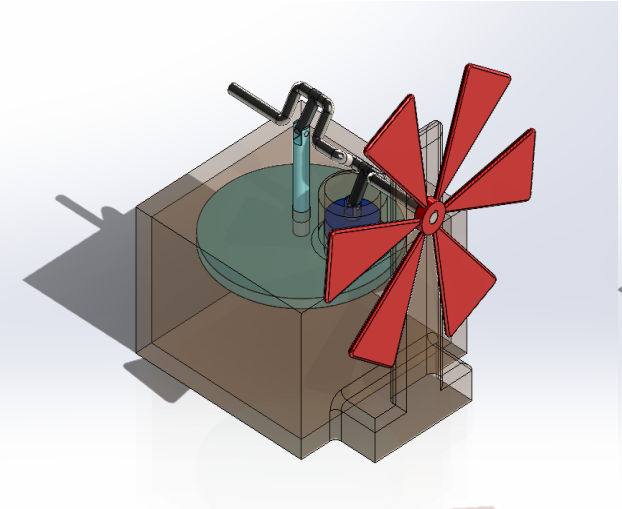


Figure 1. Piston moving up

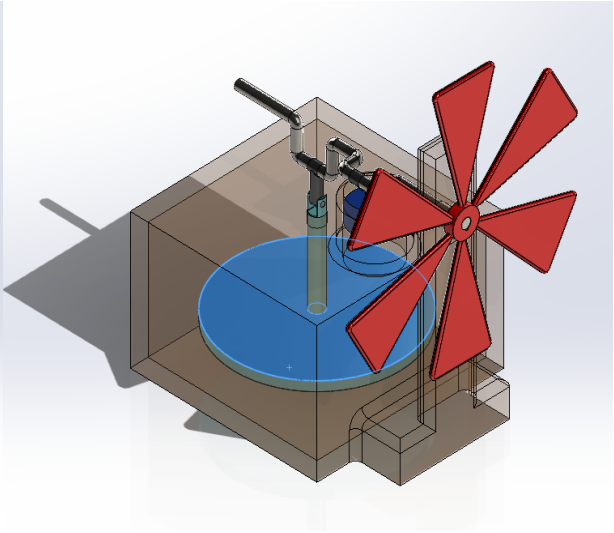
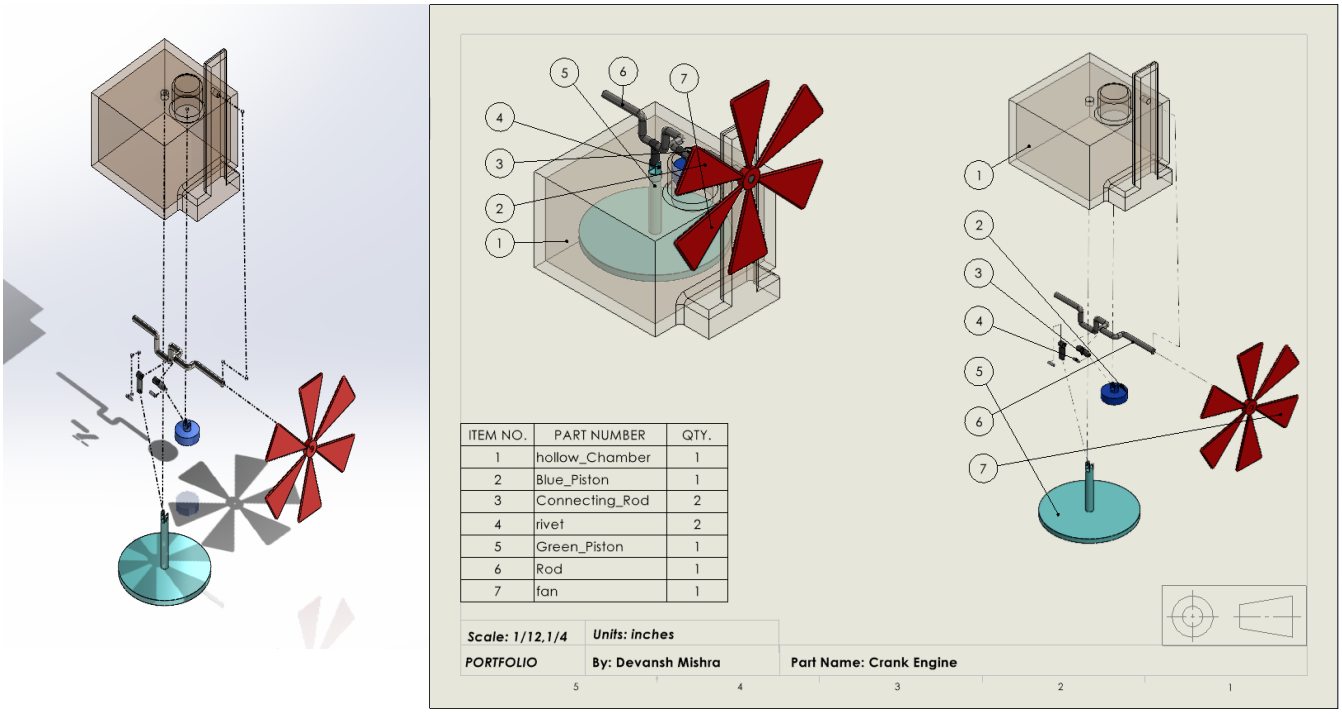


Figure 2. Piston moving down

The above figures are images of the main assembly of the Crank Engine using Solidworks with multiple piston orientations.



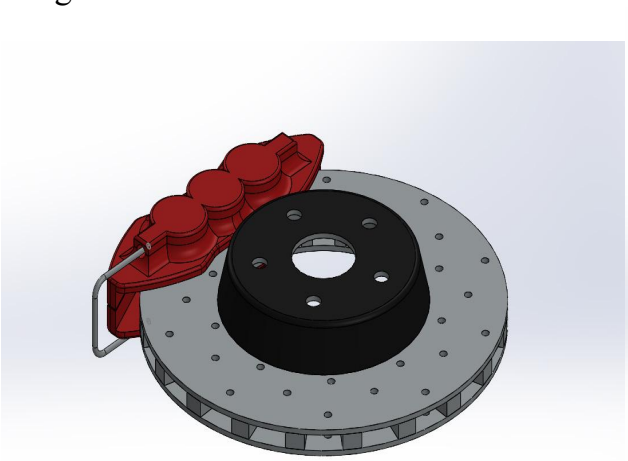
The above figures are images of the exploded assembly of the Crank Engine and the bill of materials respectively.

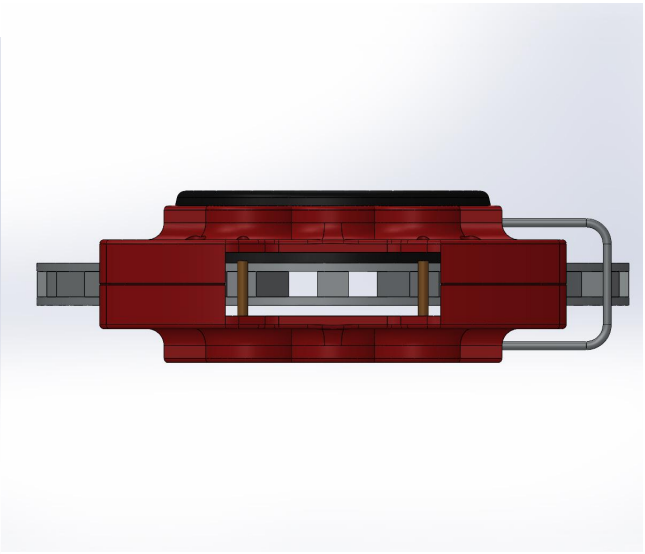
PROJECT DESIGN:
DESIGN AND ASSEMBLY OF A DISC BRAKE

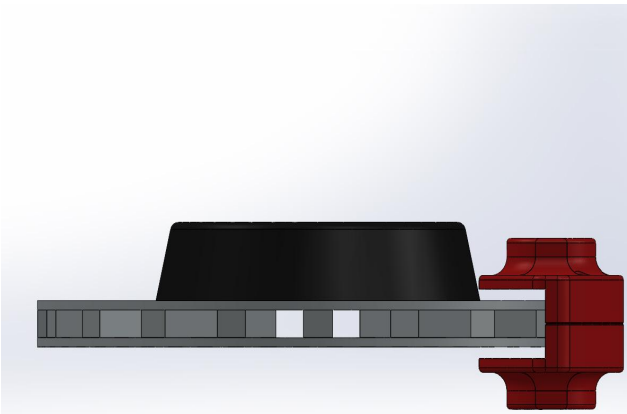
Project Title:- Disc Brake

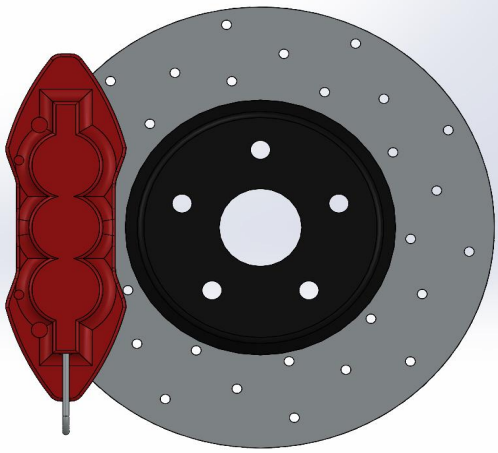
Aim:- To design a Disc Brake and its components in one part file.

Result:- A Disc Brake was designed including the product and drawings and Rendered image.

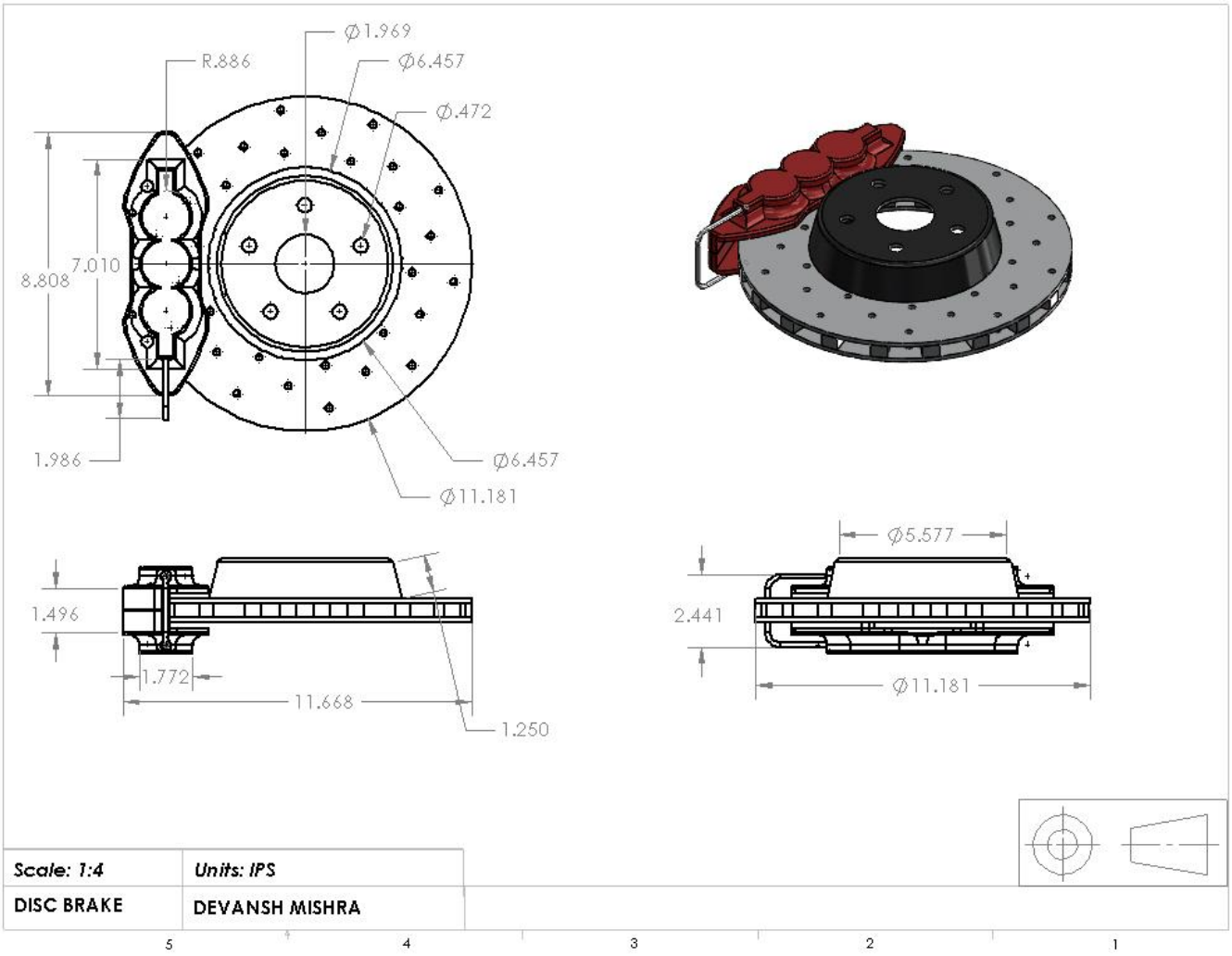








The above figures are images of the Disc Brake in multiple orientations.



Scale: 1:4	*Units: IPS*
DISC BRAKE	DEVANSH MISHRA

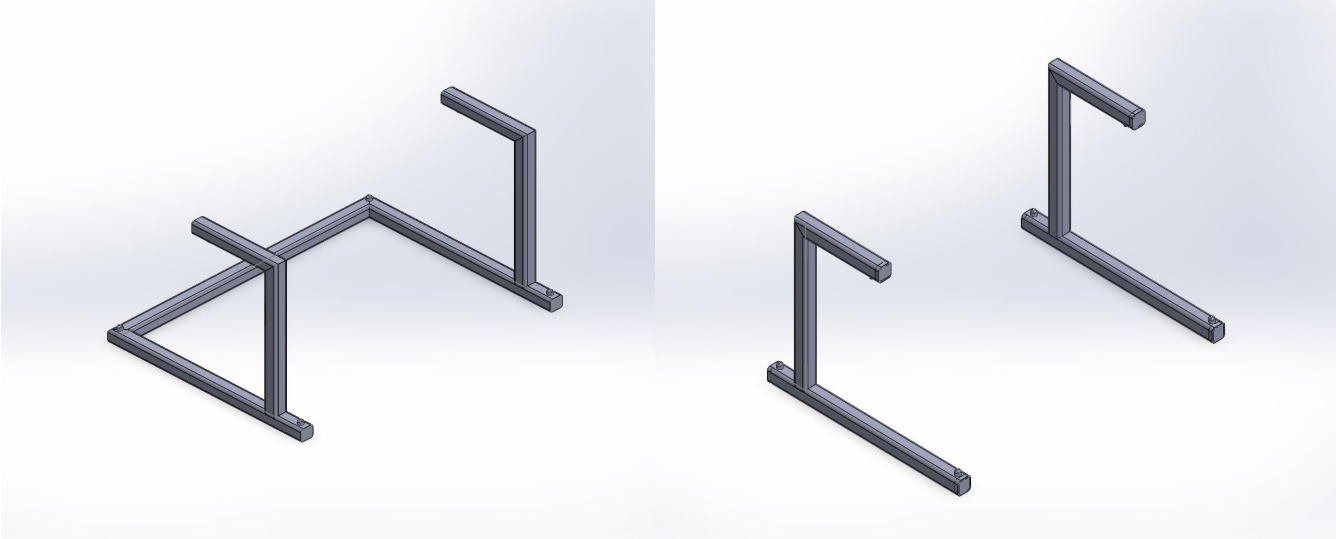
5 4 3 2 1

PROJECT DESIGN:
DESIGN AND ASSEMBLY OF A FLOATING TABLE

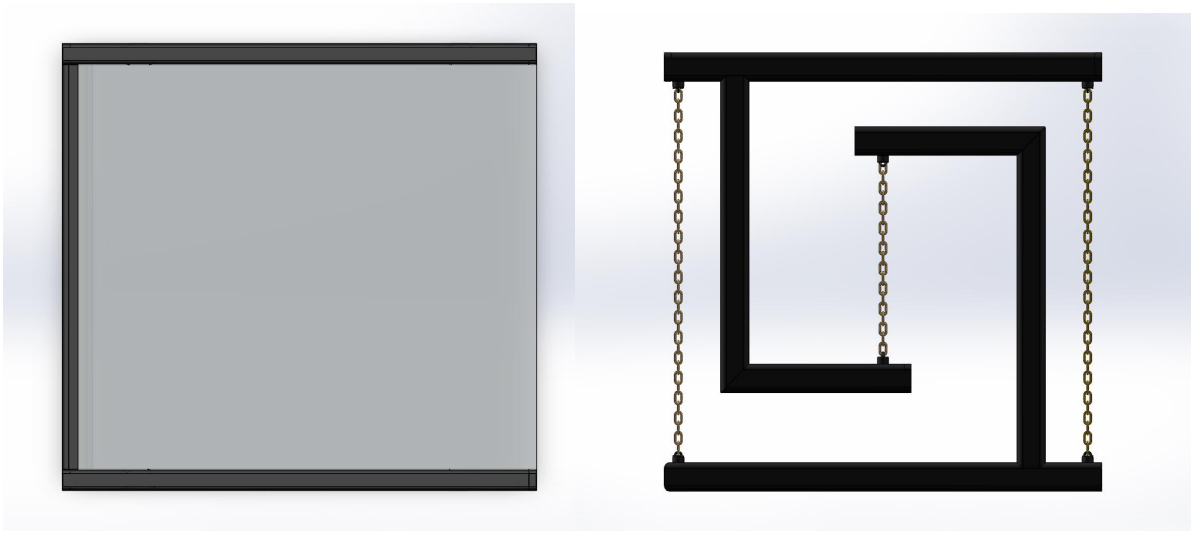
Project Title:- Floating Table

Aim:- To design and create components of a Floating table and assemble the final product (including Drawings).

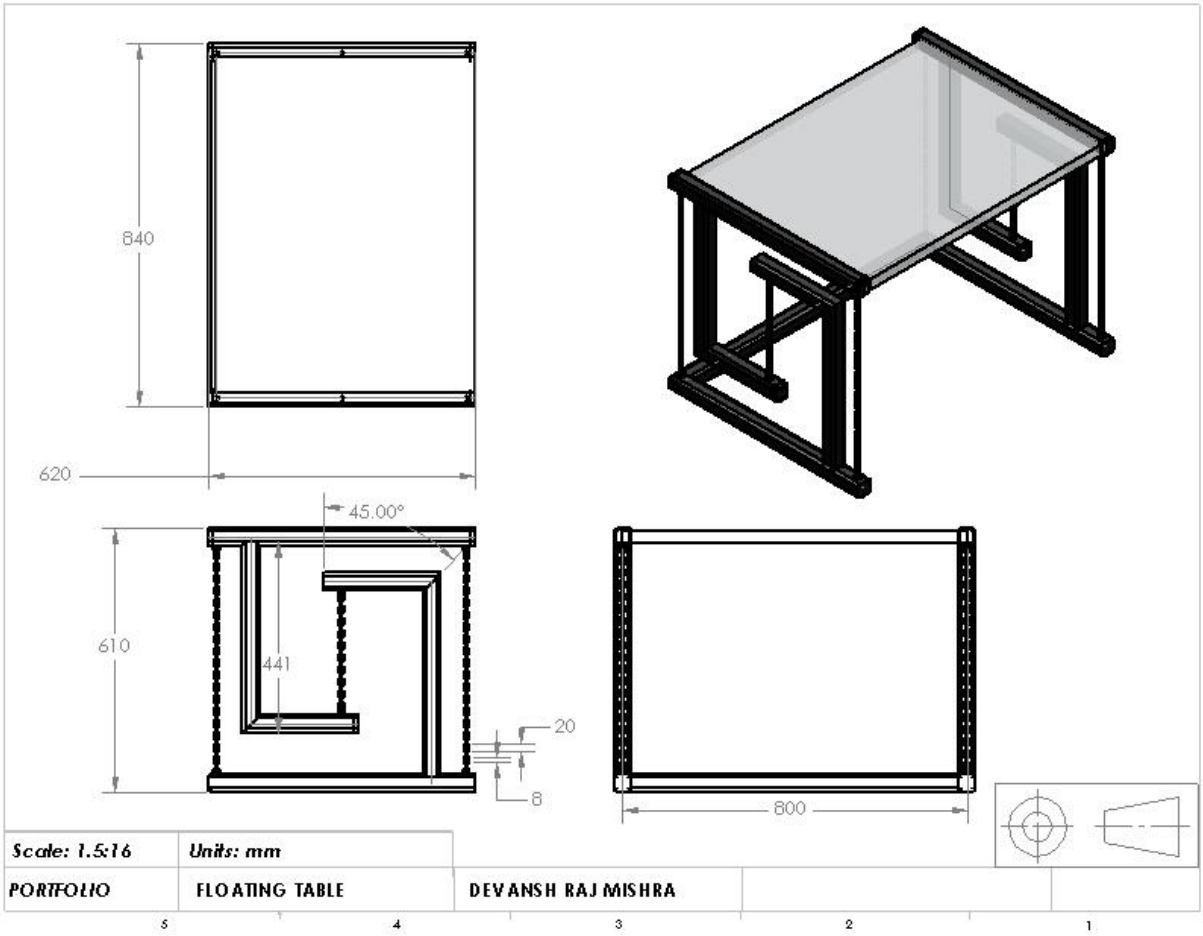
Result:- A complete Floating table was designed including the assembled product and Drawings.



The above figures are the components created and used for the main assembly of the Floating Table using Solidworks.



The above figures are images of the Floating Table in multiple orientations.

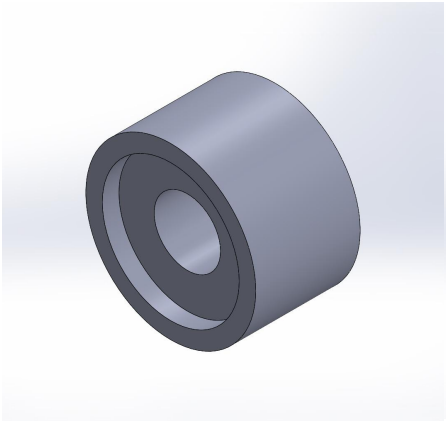


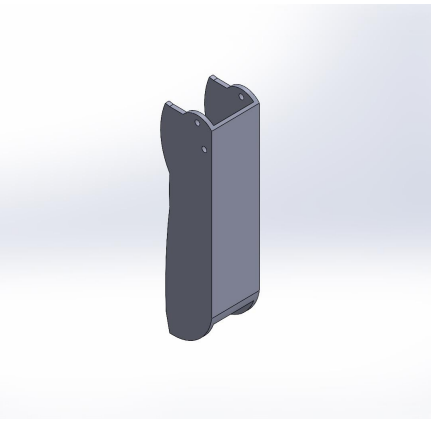
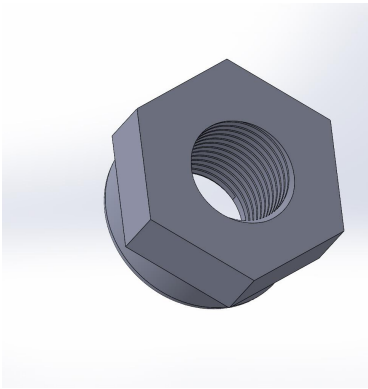
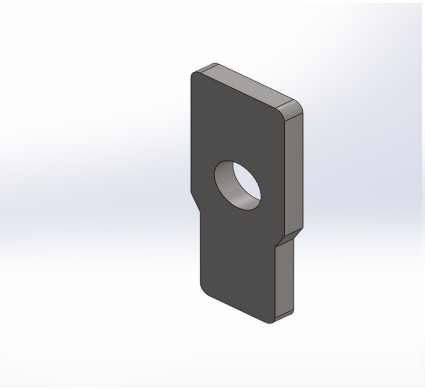
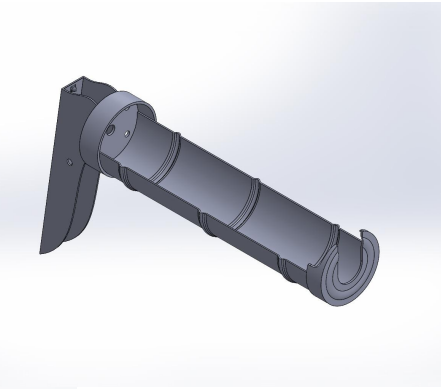
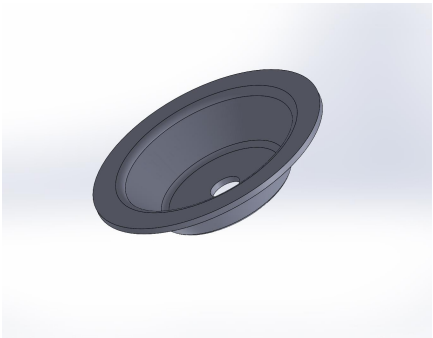
DESIGN AND ASSEMBLY OF A CAULKING GUN

Project Title:- Caulking gun

Aim:- To design and create components of a Caulking Gun and assemble the final product (including Drawings).

Result:-A complete Caulking Gun was designed including the assembled product and Drawings and Presentable Rendering with motion analysis.



The above figures are the components created and used for the main assembly of the Crank Engine using Solidworks.

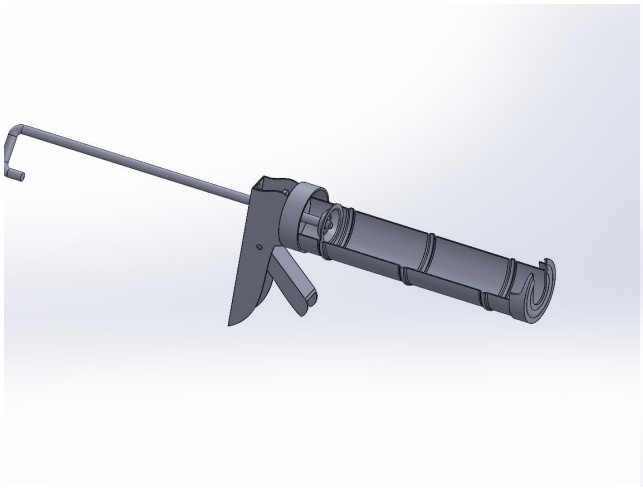


Figure 3. Plunger moving backwards

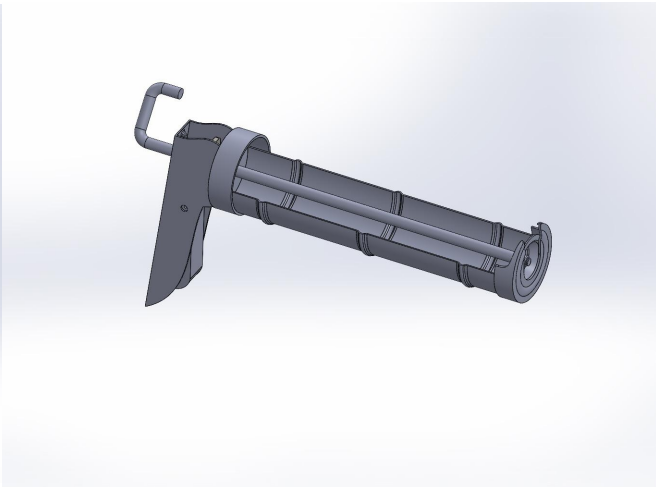
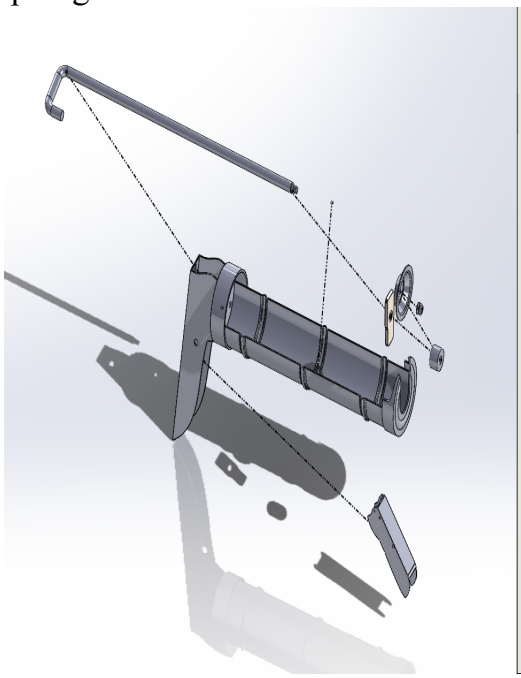
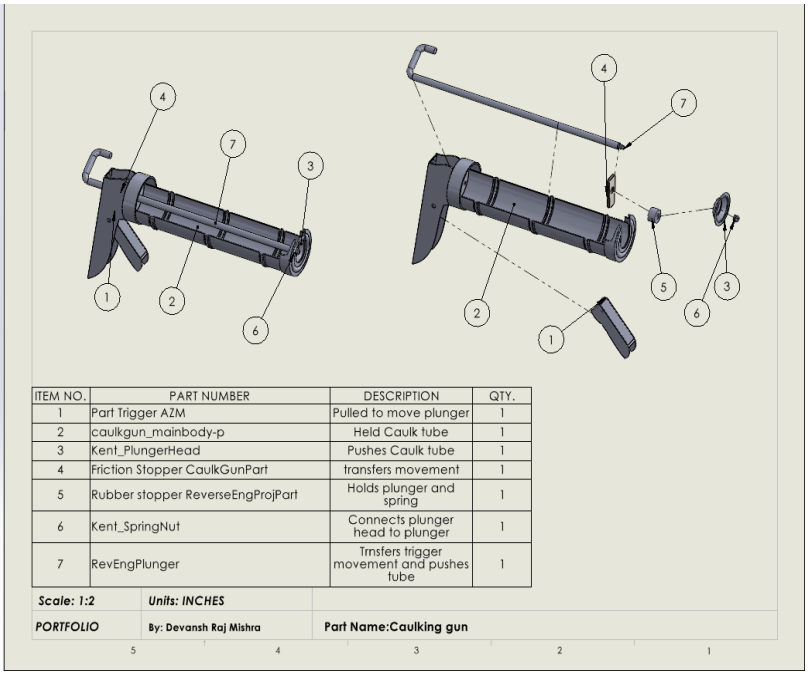


Figure 4. Plunger moving forward

The above figures are the components assembled for the Caulking Gun using Solidworks with the plunger in different locations.





ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	Part Trigger AZM	Pulled to move plunger	1
2	caulkgun_mainbody-p	Held Caulk tube	1
3	Kent_PlungerHead	Pushes Caulk tube	1
4	Friction Stopper CaulkGunPart	transfers movement	1
5	Rubber stopper ReverseEngProjPart	Holds plunger and spring	1
6	Kent_SpringNut	Connects plunger head to plunger	1
7	RevEngPlunger	Trnsfers trigger movement and pushes tube	1

Scale: 1:2	*Units: INCHES*	
PORTFOLIO	By: Devansh Raj Mishra	Part Name:Caulking gun

5 4 3 2 1

The above figures are images of the exploded assembly of the Caulking Gun and the bill of materials respectively

DESIGN AND ASSEMBLY OF A KANT TWIST CLAMP

Project Title:- Kant Twist Clamp

Aim:- To design and create components of a Mechanical Clamp and assemble the final product (including Drawings).

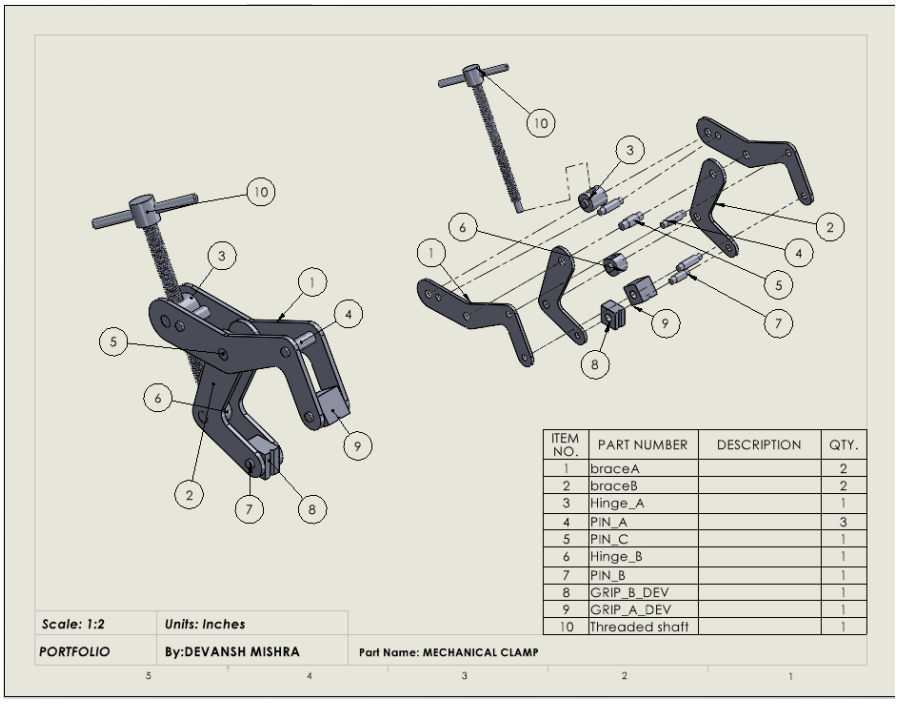
Result:-A complete Mechanical Clamp was designed including the assembled product and Drawings and Presentable Rendering with motion analysis.

The above figures are the components created and used for the main assembly of the Mechanical Clamp using Solidworks.

Figure 3. Clamp Opening

Figure 4.Clamp Closing

The above figures are images of the main assembly of the Mechanical Clamp using Solidworks with multiple piston orientations.



ITEM NO.	PART NUMBER	DESCRIPTION	QTY.
1	braceA		2
2	braceB		2
3	Hinge_A		1
4	PIN_A		3
5	PIN_C		1
6	Hinge_B		1
7	PIN_B		1
8	GRIP_B_DEV		1
9	GRIP_A_DEV		1
10	Threaded shaft		1

The above figure is an image of the exploded assembly of the Mechanical Clamp and the bill of materials respective

DESIGN AND ASSEMBLY OF A MINI GOLF PUTTER

Project Title:- Mini Golf Putter for persons with Parkinson's Disease

Aim:- To design and create components of a mini golf putter and assemble the final product (including Drawings).

Result:-A complete Mini Golf Putter was designed including the assembled product and Drawings and Presentable Rendering with motion analysis.

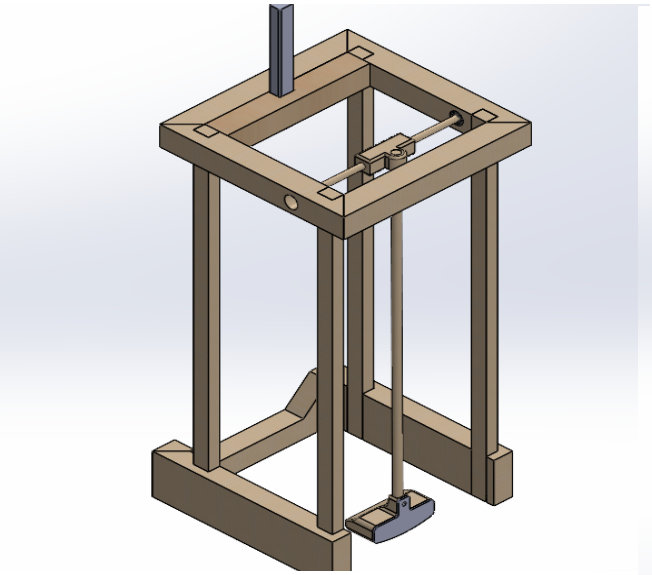


Figure 1. Resting Putter

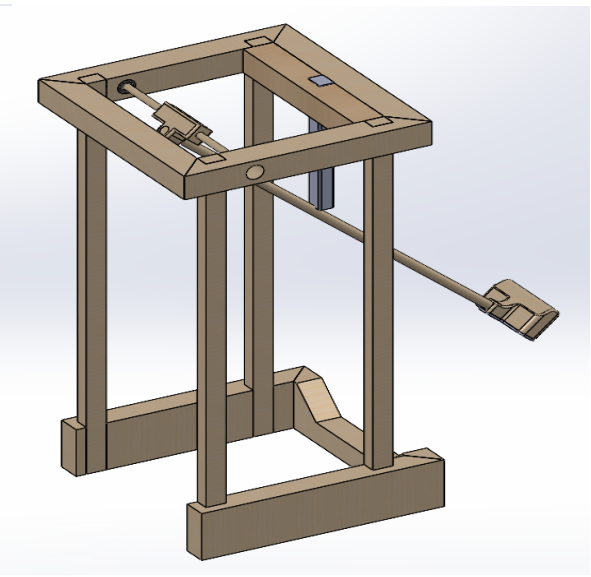


Figure 2. Putter in Action

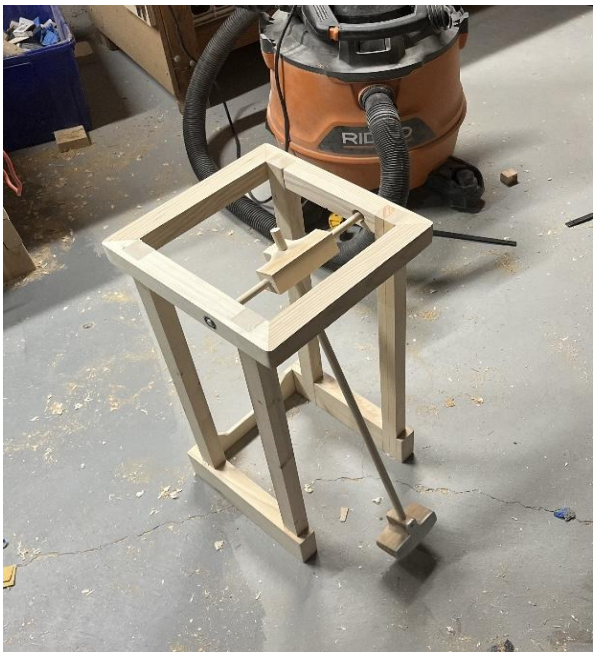


Figure 3. Assembled modeled