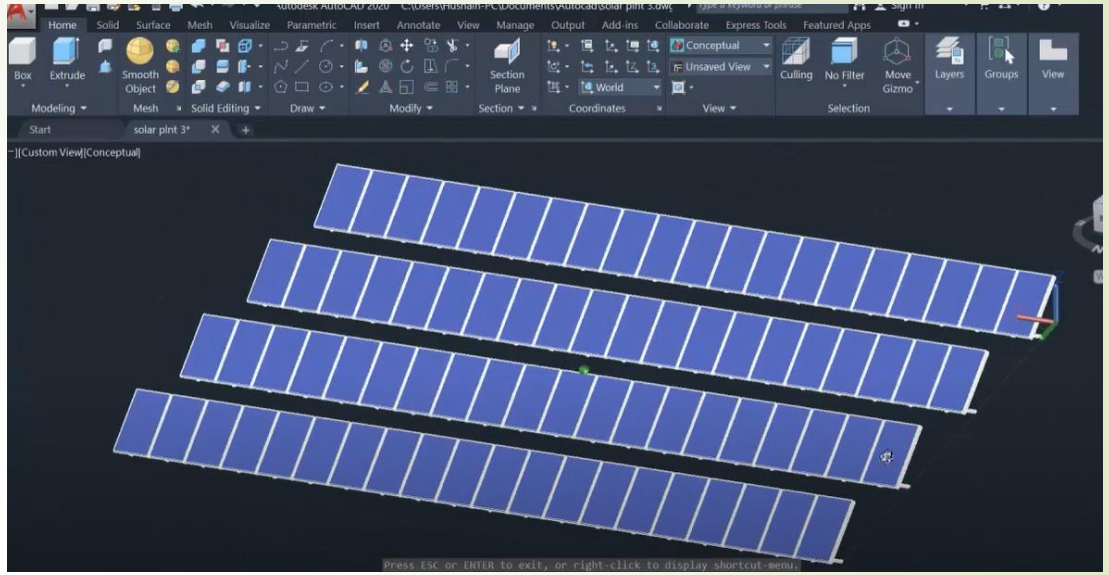
Rishika Jain

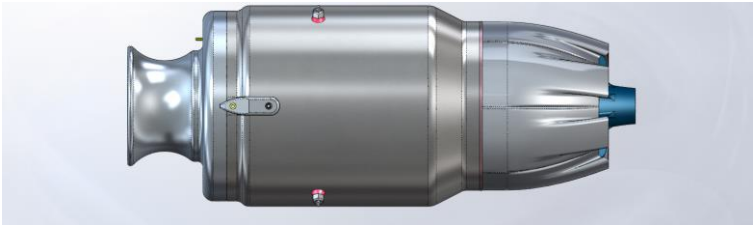
- Mechanical Engineer
- Interested in Design and Manufacturing
- Firm believer in leadership, teamwork and collaboration
- Loves travelling, cooking, amicable, admiring diverse cultures
- Being a Bluedevil

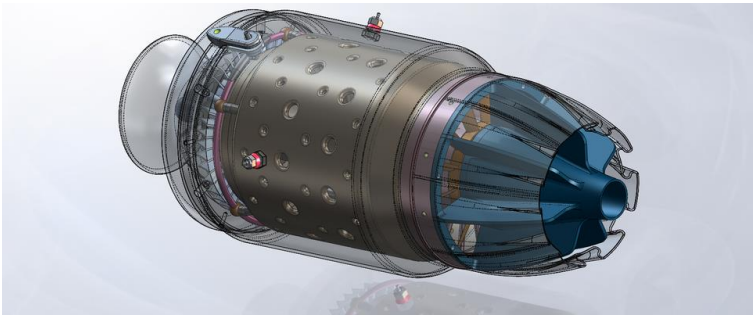
Solar Engineer- Manabu Foundation

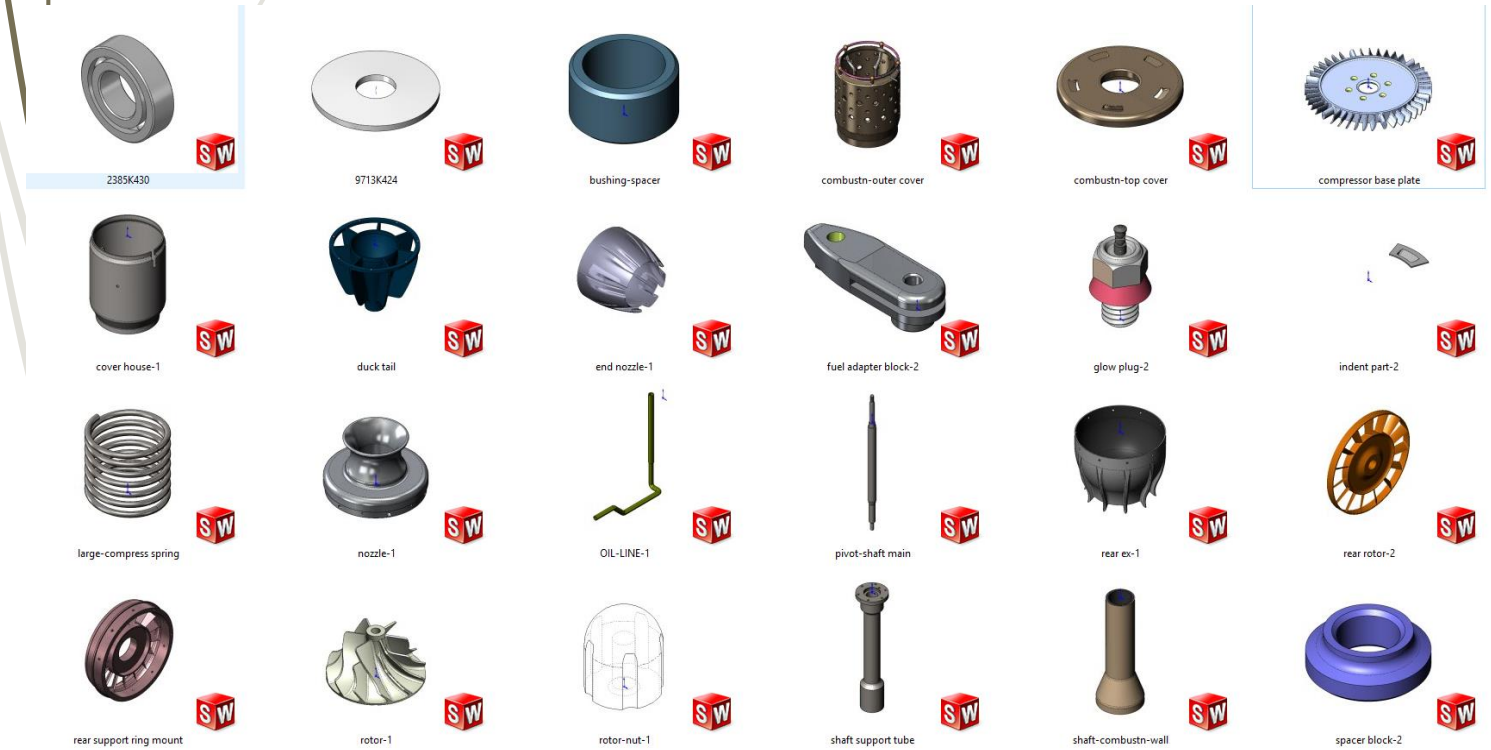
- Drafted solar panels using Autocad
- Added new material in its library to give the similar properties of PV material. (Gallium arsenide)
- Gave the background using Revit to increase the visual graphics.
- In Future need to made electrical connections to the substation and transformers as shown



Design analysis and additive manufacturing of Turbojet Engine-KJ66

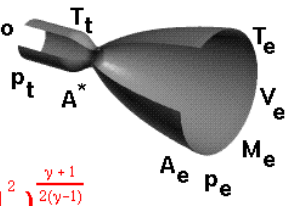






Known:

p_t = Total Pressure
T_t = Total Temperature
p_o = Free Stream Pressure
γ = Specific Heat Ratio
R = Gas Constant
A = Area



Mass Flow Rate: $\dot{m} = \frac{A^* p_t}{\sqrt{T_t}} \sqrt{\frac{\gamma}{R}} \left(\frac{\gamma+1}{2}\right)^{-\frac{\gamma+1}{2(\gamma-1)}}$

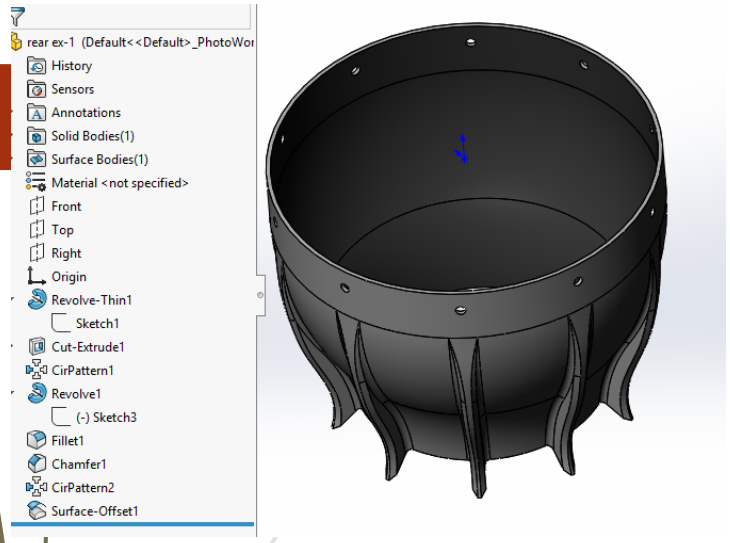
Exit Mach: $\frac{A_e}{A^*} = \left(\frac{\gamma+1}{2}\right)^{-\frac{\gamma+1}{2(\gamma-1)}} \frac{\left(1+\frac{\gamma-1}{2}M_e^2\right)^{\frac{\gamma+1}{2(\gamma-1)}}}{M_e}$

Exit Temperature: $\frac{T_e}{T_t} = \left(1+\frac{\gamma-1}{2}M_e^2\right)^{-1}$

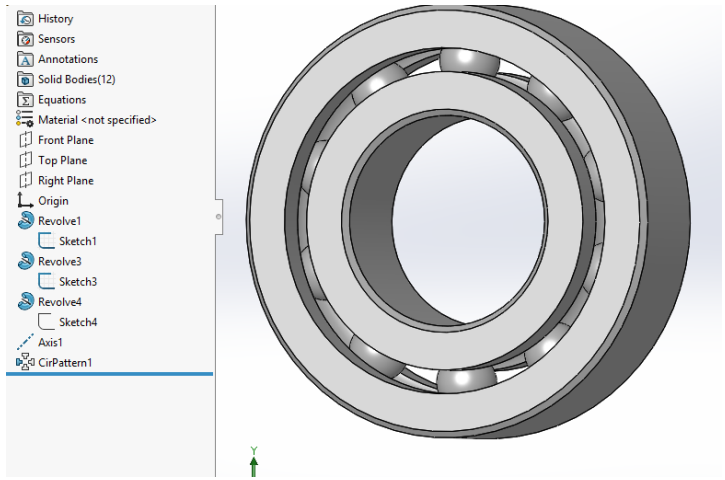
Exit Pressure: $\frac{p_e}{p_t} = \left(1+\frac{\gamma-1}{2}M_e^2\right)^{-\frac{\gamma}{\gamma-1}}$

Exit Velocity: $V_e = M_e\sqrt{\gamma R T_e}$

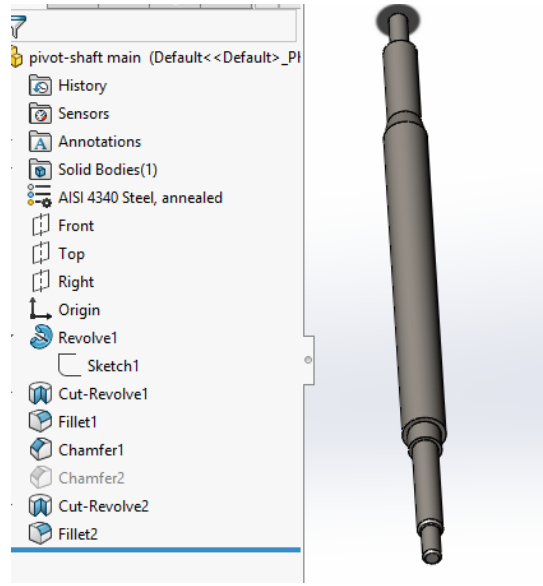
Thrust: $F = \dot{m} V_e + (p_e - p_0) A_e$



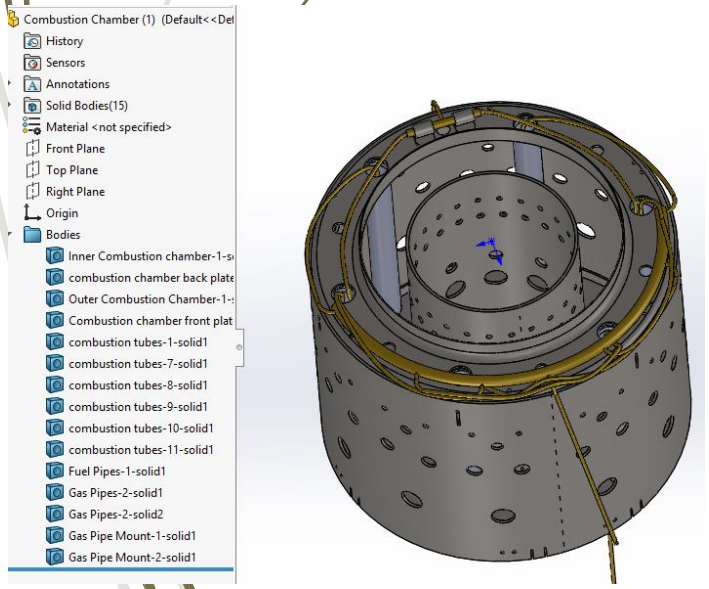
REAR EXHAUST



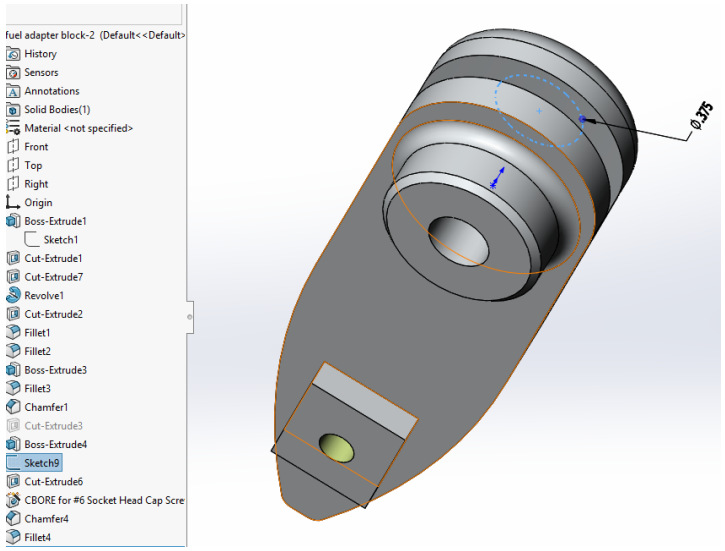
REAR SUPPORT RING



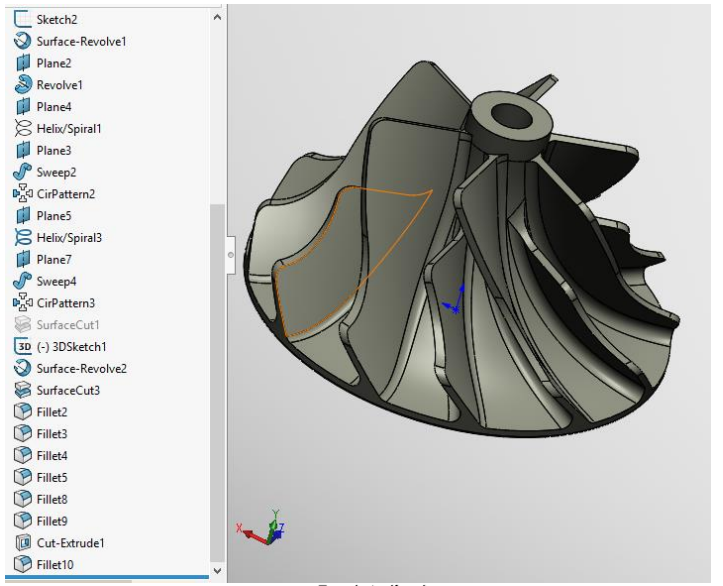
PIVOT SHAFT



Combustion chamber



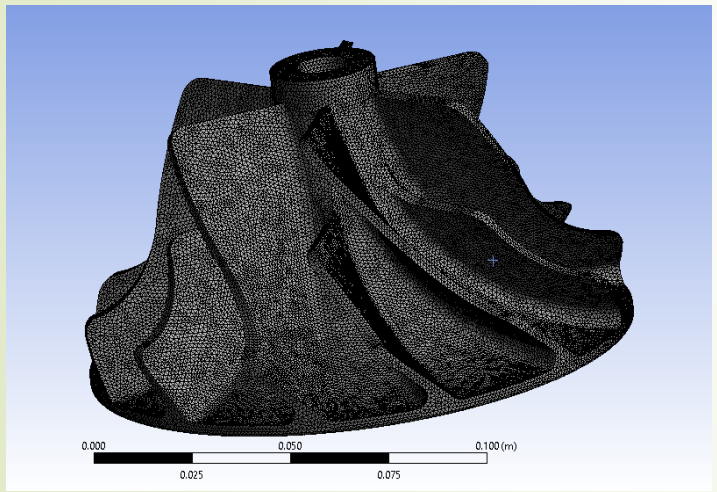
ROTOR



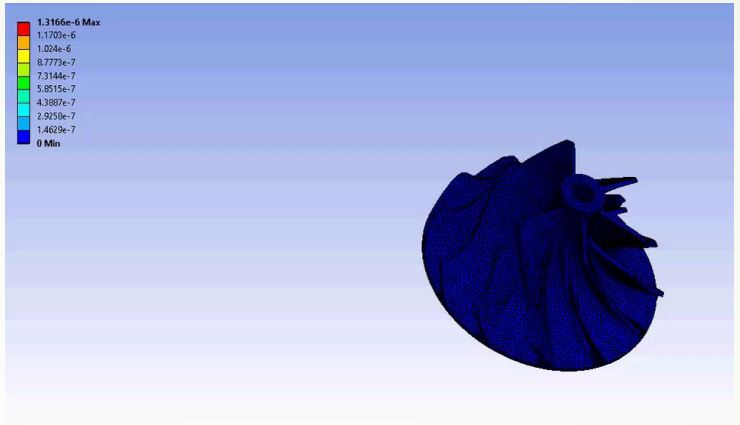
Fuel Adjuster

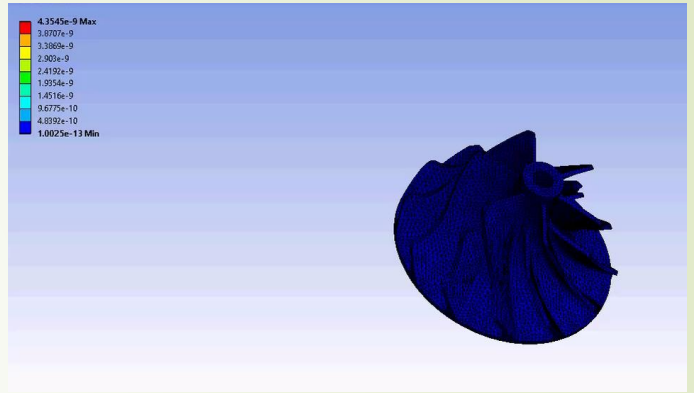
Static structural analysis in ANSYS

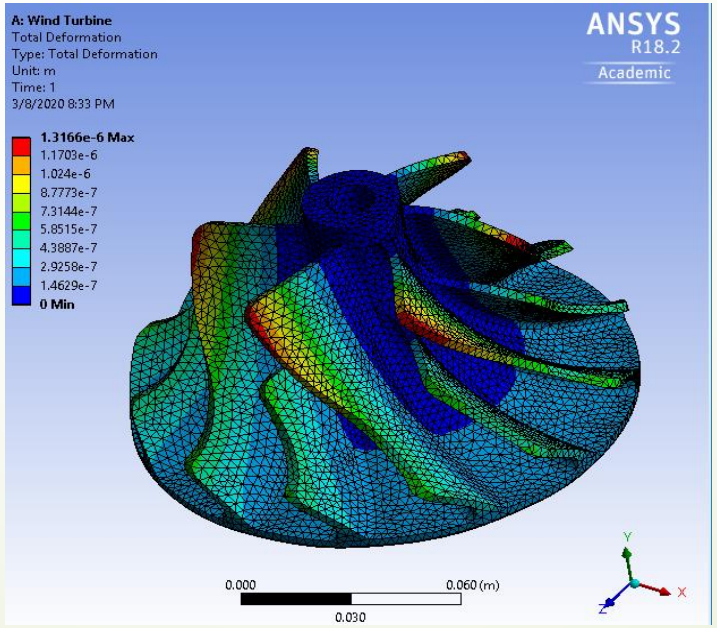
- NODES: 3219378
- ELEMENTS: 2282197



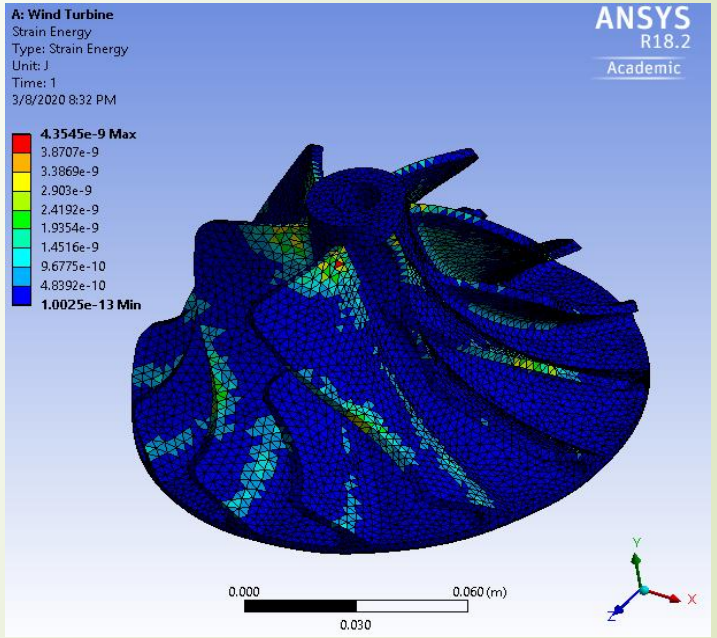
Basic deformation analysis on the compressor blades







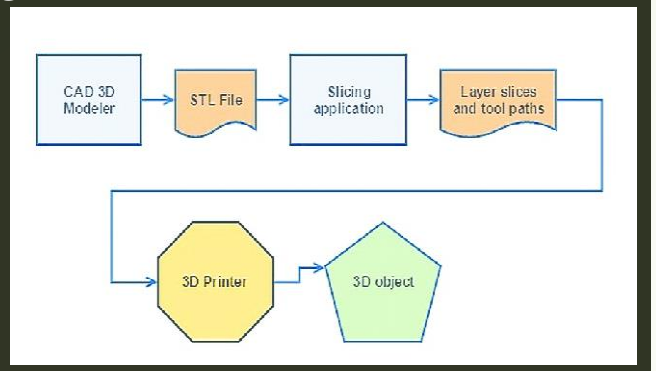
Deformation



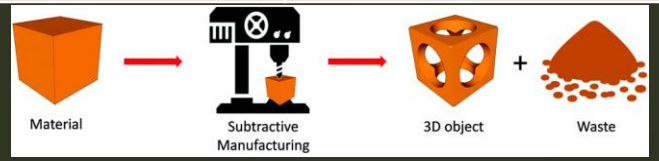
Strain Energy

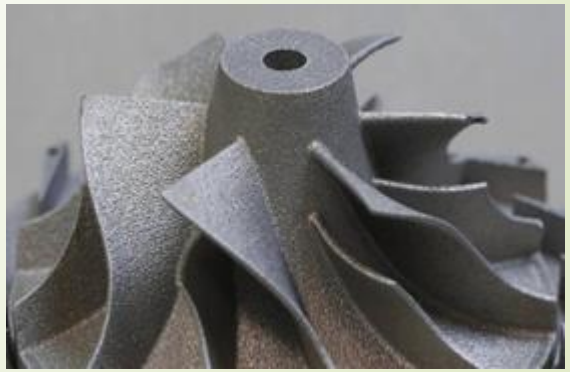
Additive manufacturing(3D-Print)

- **Selective Laser Melting (SLM)-cobalt chrome**
- **Vat Polymerization techniques**
- **Material**
- **Fused Material Deposition**



AM	CNC	Molding
• Polymers, Metals, Ceramics, Waxes, Paper laminates, Composites • Generally superior for complexity • Potentially large number of parameters, but relatively simply • Must consider orientation • Once parameters dialed in, rinse and repeat for new parts • Single stage* • Batch print • Predictable duration	• Hard, non-brittle materials only (metal, hard polymer, wood) • Very wasteful • Limited for undercuts, enclosed features • Determining sequence of tools/cuts can be very involved • Each part may require its own strategy • Multi-stage • Repositioning • Time can be unpredictable	• Polymers, Metals, Ceramics, Waxes • Wasteful molds • Very limited for internal or complex features, Must be able to assemble (and remove) mold • Mold/tool can take months to develop • Each part requires its own mold/tool • Mold/tool can take months to develop ($$) • Great for high volume



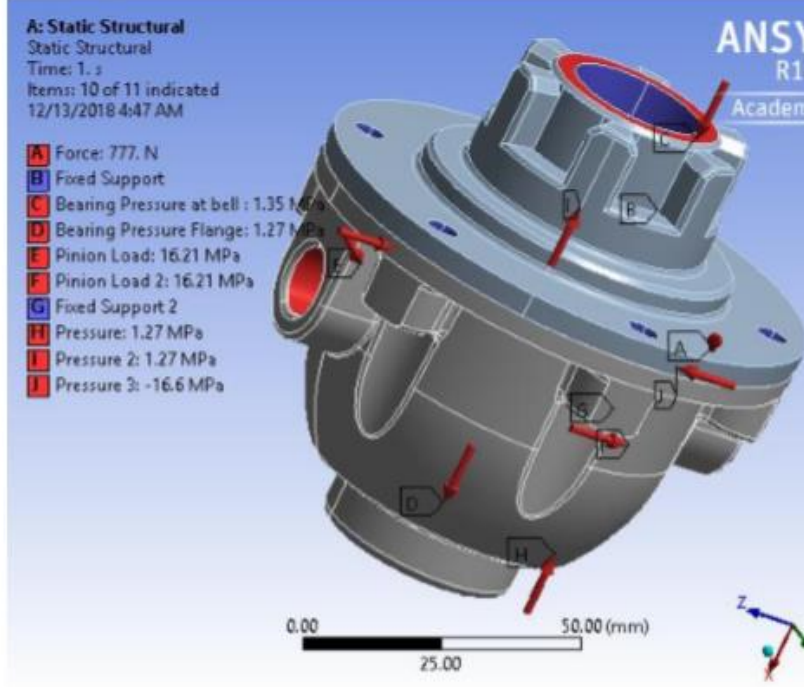


Design And Analysis of Automotive Powertrain Differential using Static Analysis

Two traditional materials with properties of new NYLON 66 and compare their performances:

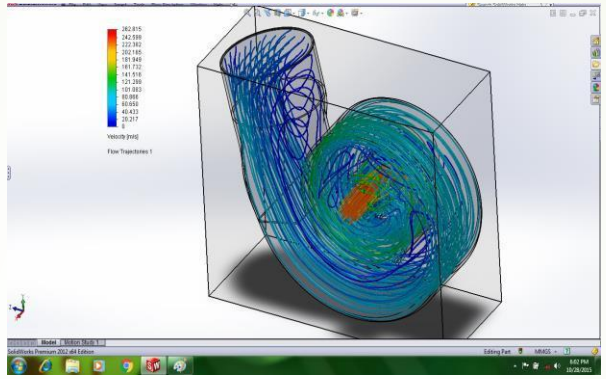
- Structural steel
- Aluminium
- Reinforced polymer polyamide nylon 66

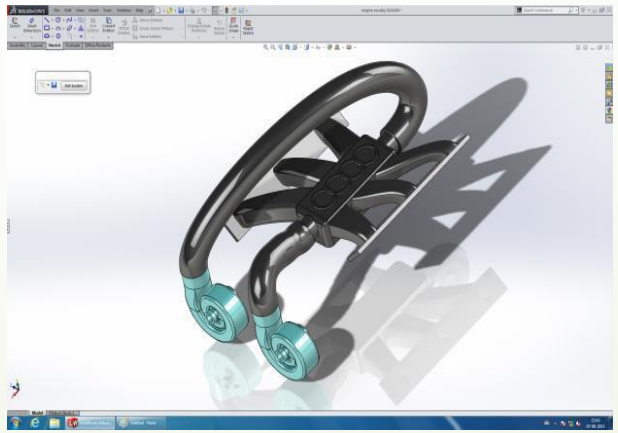
- Designed using solidworks - Complex part
- Many internal features designed easily
- Analsis has been done in ANSYS
- FEA setup used by the EATON design model all the pressure condition and forces are given to it.
- Normal stress and shear stress have been calculated
- The maximum shear stress in aluminum is 9.4506 MPa and in steal is 9.4108 while in nylon it is 7.932MPa which is much lesser as compared to both the material
- As the result of using NYLON weight is reduced and corrosion resistance is provided with less loss of power due to lower coefficient of friction

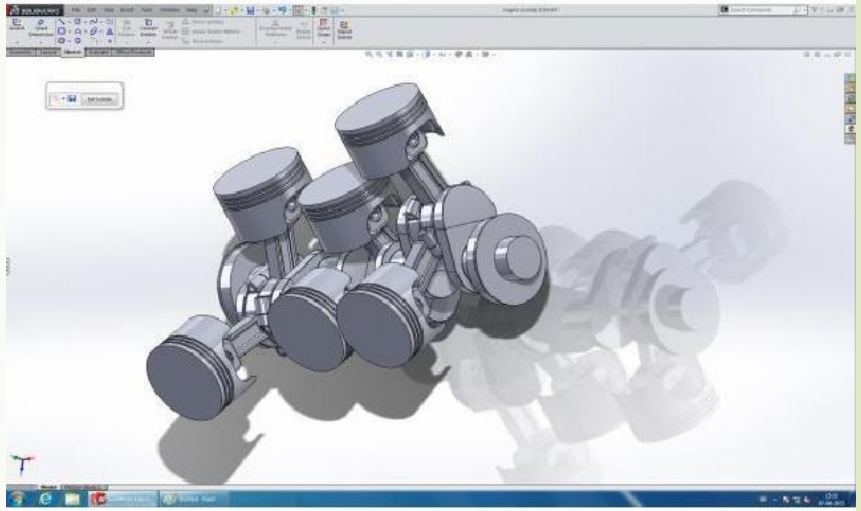


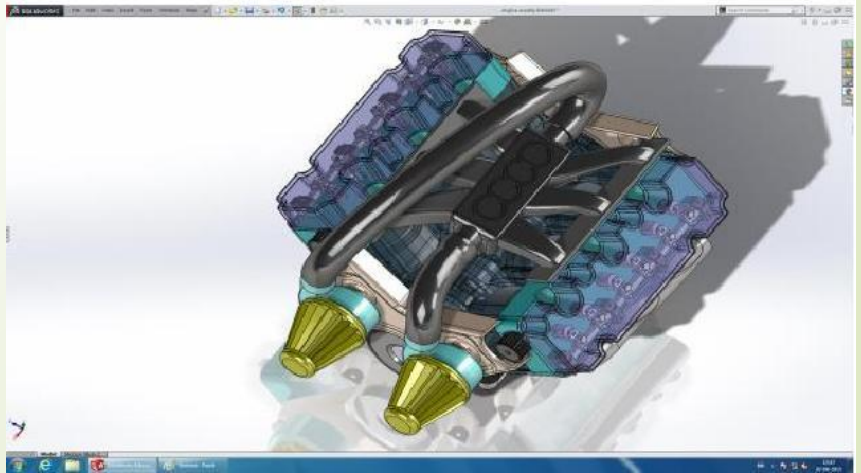
“Performance and Economic Design Evaluation of Twin Turbochargers in V6 Engine”; IEEE paper ID: PID4111405 -ICETECHGE271

- V6 Engine is made using SOLIDWORKS
- Piston, connecting rods, Crankshaft camshaft and bearing caps, intake and exhaust manifold,Turbochargers, airfilter all being dimensioned
- Design compled modelled assembly in Solidworks 4 stroke CI engine with 2 lts capacity and 12 valves
- Solidworks Flow simulation using turbulent wall boundary flow conditions with 6 bar static pressure and mass flow rate of 0.18 kg/s
- The analysis show the increase in horsepower and average speed when compared the engine simulation with or without being turbocharged





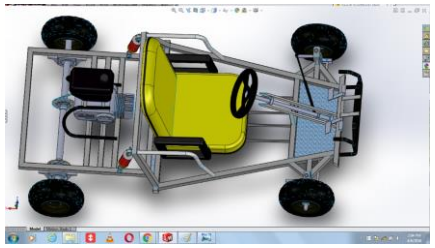


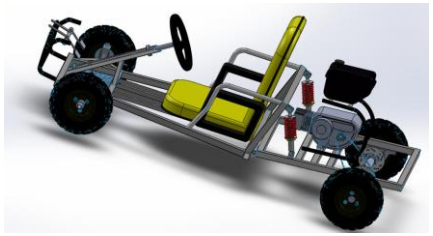


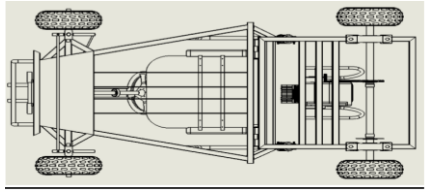
Low budget GO – KART using Bike Engine

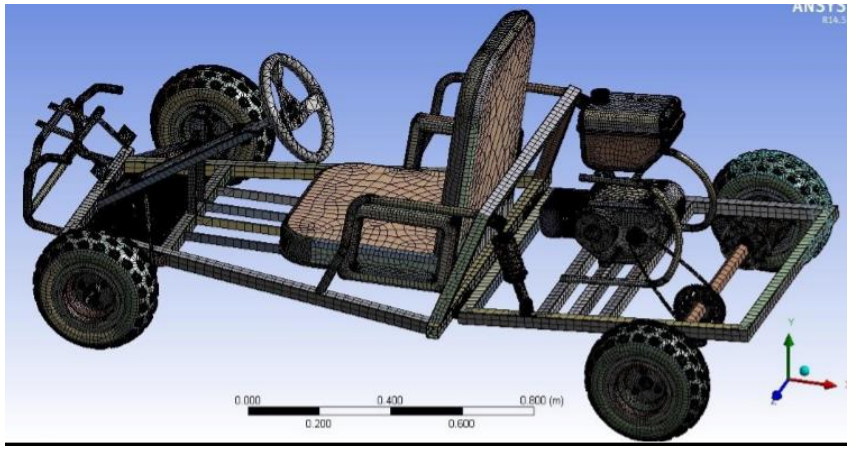
In just $200

- Lead team of 4 people and did 3D Modelling of Go-kart chassis in SolidWorks and analysis of chassis using ANSYS for stress testing
- Manufactured a fully operating go kart using various welding techniques
- I majorly designed the ackerman principles and designed the steering and chassis.
- Rest all components were divided among team of four



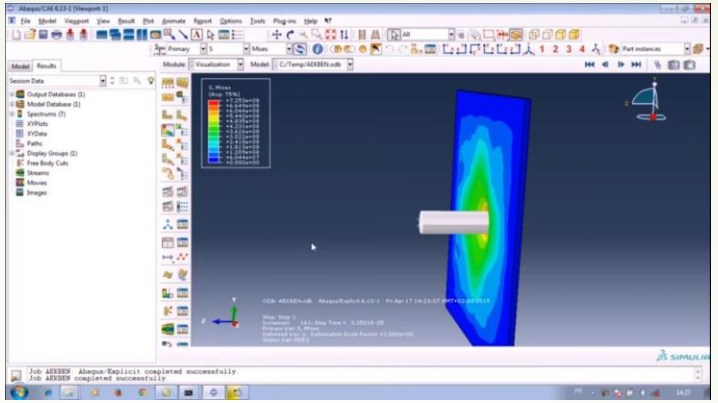


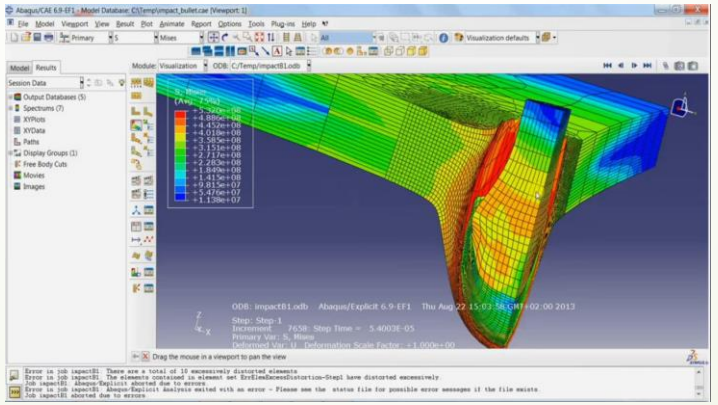


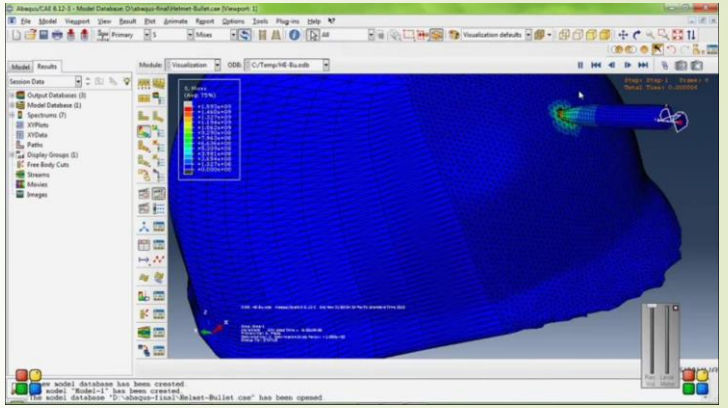


Works at MKU Ltd.

Bullet penetration test	•Testing on helmets and nonlinear dynamics for crack propagation in ceramics
Design of Mold and Die	•Curvature compression die and mold were designed using Solidworks •Provided better protection
Press machining tool design	•Designed a tool machine to press the aramid material before molding
Tensile Testing and autoclave molding	•Performed various physical tests to see the durability of the helmet







https://sintratec.com/product/sintratec-s2/

Degradation of cutting tool and Anomaly detection, Data Analytics (Python) **10/2019 – 12/2019**

- **Performed feature extraction on the dataset, extracted time and date by changing the format to datetime.**
- **Improved the model by 52% using SARIMAX model, reduced RMSE from 144 to 68.86.**

ERP Marketplace Simulation Game, Supply Chain (SAP-ERP, Data Visualization, Excel) 09/2018 – 12/2018

- **Investigated trends and production cycles collaboratively with team members, monitored marketing expenses.**
- **Participated in brainstorming sessions to develop a marketing plan and sales strategy, increased total sales by 35%.**
- **Invested in setup time and production capacity, improved productivity by 51% and generated a revenue of $9.1M.**

Analyzed Bigdata from DEA Opioid Drug analysis for mortality using Python and Tableau 09/2019 – 11/2019

- **Data Wrangling of bigdata obtained from 2 million having opioid use disorder (OUD) involving prescription opioids**
- **Pre-post analysis with a difference-in-difference (diff-in-diff) approach trend graphs.**

Reverse Engineering of electromechanical gearbox of Insulin Pump 07/2019 – 12/2019

- **Design and analysis of electromechanical assembly of the gearbox and its reverse engineering theory analysis.**
- **Manufacturing using 3d printing and its assembly with re-iteration using NX.**

Other projects