Alok Gupta

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# Professional Summary

* Mechanical Design Engineer with experience of 5+ years in product design, manufacturing and validation in aerospace.
* Proficient in utilization of CAD Tools for innovative product design and developments backed with sound knowledge of

mechanics of materials and manufacturing techniques for metallic and composite structures.

* Experienced in all the stages of product developments with multitasking in the Research & development wing and ability to carry tasks individually under minimum supervision.

# Work Experience



* Organization: **Euler Motors,** New Delhi (Dec,2022 – Present)
  + Designation: Design Engineer
  + Responsibilities include:
    - Design the automation fixture for the laser welding of the battery pack.
    - Design the busbar and end terminal of the lithium ion battery pack using finite element modeling.
    - Worked on sheet metal parts to design the casing and its child parts also process setup for the production
    - Design optimization in the existing battery pack assembly to reduce the production cost and time.
    - CFD simulation of the cooling system in the battery pack assembly and calculate the pressure loss and

coolant requirement for the system.

* + - Designed a custom coolant splitter which reduced the mass by 80% from the existing designed product.
    - Worked on PMSM motor structural components design using NASTRAN Hypermesh.
    - Worked on the GD&T and tolerance stackup analysis of the battery pack assembly and motor assembly.
* Organization: **Agnikul Cosmos Pvt. Ltd.,** Chennai (Apr,2019 – Nov 2022)
  + Designation: Structure Engineer (Aerospace)
  + Responsibilities include:
    - Planning and managing for optimization of motor casing and pump parts using metal additive manufacturing technology
    - Project manager for the precision assembly of **high rpm motor and centrifugal/turbo pump.**
    - Developed the complete manufacturing planning & assembly documents and verified by Dr. N Manicakm, Retd. DRDO

Scientist H, Vehicle assembly & integration department (as an Agnikul advisor).

* + - Done CAD, FEM (structural and thermostructural) analysis of Motor cooling system, Rocket Turbo pump, rocket engine.
    - Design of fixtures and manufacturing equipment for machining.
    - Detailed 2D drawing generation for parts, part assembly and installation include the EBOM & MBOM.
    - Involvement in the composite parts design, development and validation.
    - Project lead for the design, development & testing of high performance induction motor.
    - Designed and realized complex components like Motor casing, pump volute, drive casing, etc by 3D printing which

reduced the manufacturing time by 65%.

* + - Perform Model based definition (MBD) in software to reduce the manufacturing complexities.
    - Few highlighted projects in engineering design

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| Project | Component | Design objective | Design constraints | Design methodology | Final outcome |
| Lox pump induction motor | Cooling jacket | Minimize mass | * 5kW heat dissipation capacity * Make in single piece * factor of safety maintain more than 1.1 | * Heat transfer analysis done on ANSYS * 1D heat transfer calculation done in MATLAB * Used topology optimization to reduce mass * Structural stress analysis done * Designed for additive manufacturing to make in   single piece. | * Mass achieved   5.5 kg   * Final product realized by 3D printing for   testing |

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| --- | --- | --- | --- | --- | --- |
| Motor drive system | PCB casing | Minimize mass | * 3kW heat dissipation capacity * Complete assembly should not be more than 3   components   * Bounding box should be within 100 x 250 x 100mm | * Heat transfer analysis done on ANSYS * 1D heat transfer calculation done in MATLAB * Design for easy accessibility * Structural analysis done on ANSYS | * Mass achieved   0.7 kg |
| Rocket engine test rig | Thrust stand | Minimize structural deformatio n under loaded condition | * It should fit in 10 x 8 x 8 ft container * Provision for routing of electrical and plumbing   lines   * Interface with engine at 14 degree angle | * Done stress analysis using beam model * Thermal analysis due to radiation of plume * Thermostructural analysis | * Deformation achieved less than 1mm * Engine testing successfully   done more than 25 times |

* + - * Few highlighted projects related to Geometric Dimensioning & Tolerancing GD&T

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| --- | --- | --- | --- |
| Project | Component | GD&T | Final outcome |
| Lox pump assembly | Centrifugal pump | * Done 1D stackup analysis * Decide type of fits at all the interfaces and prepare CAPP. * Flatness, parallelism, total runout, cylindricity, surface finish etc   decided for volute, shaft & other parts. | * Assembly of the centrifugal pump done with satisfactory results |
| Lox pump Induction motor | Induction motor | * Done 1D stackup analysis * Flatness, parallelism, total runout, cylindricity, concentricity, surface   finish etc decided for the shaft, casing, cover plate etc. | * Motor successfully assembled and tested for 40000 rpm. |
| Orbital launch vehicle | Launch vehicle assembly | * Done 3D stackup analytical calculation | * Review of launch vehicle assembly document cleared by Dr. N Manicakm, Retd. DRDO Scientist H, Vehicle   assembly & integration department (as a Agnikul advisor) |

* Organization: **ATULYA MOTORS,** Ghaziabad (Dec,2017 – Mar,2019)
  + Designation: Engineer
  + Responsibilities include:
    - Designed the lithium ion battery pack assembly for the Electric vehicle.
    - Made a manufacturing process document for the subcomponents of the vehicle.
    - FE modeling for vehicle frames using composite structure.
    - Test the performance of retrofitted vehicles after assembly.
* Organization: **Sona BLW Precision Forging,** Gurugram (June,2017 – Nov,2017)
  + Designation: Engineer (GET)
  + Department : R&D
  + Responsibilities include:
    - Project lead for the solid axle assembly for the light duty vehicle.
    - Design, development and testing of automobile gearbox.
    - To ensure the quality of the parts from the supplier is as per the requirements and make sure no delay in the delivery.

# Skills

* Softwares: CATIA V5, Solidworks,AutoCAD, Ansys workbench, PLM tool -Teamcenter, NASTRAN PATRAN Hypermesh.
* **NPTEL** courses done for Design guidelines for product design, Product design thinking and innovation.
* Extensive experience in aerospace grade manufacturing process , Computer Aided Process Planning (CAPP), MES.
* Able to create 3D models, raw material, fasteners selection and detailed mechanical drawings for parts and assemblies
* Good knowledge of root cause analysis tools and corrective actions required in problem solving & process improvement.
* Good knowledge in drafting with Geometric Dimensioning & Tolerancing GD&T as per (ASME Y 14.5).
* Have good knowledge of machining processes required to obtain finished products like milling, turning, EDM, grinding, micro machining process etc.

# Projects



* **Design, Fabricate and Test a durable and cost-effective ATV (*BAJA SAE INDIA,*** *2015, 2016 & 2017)*

**Advisors:** Mr. Tuhin Srivastava, Mr. Jitendra Singh Role – Team manager, Chassis, Engine & CAE lead.

# Design and Fabrication of an All-Terrain Trolley

o Trolley for carrying luggage very smoothly on any surface e.g. stairs, uneven surfaces etc.

# Design and fabrication of lightning tower

***Advisor:*** Dr. Ashish Karnwal

To carry light arrangements on the Construction site (DMRC) assembled with MAHINDRA GENX.

# Education

* Dr. APJ Abdul Kalam Technical University, Lucknow, India 2013–2017

Bachelor of Technology: Mechanical Engineering ***First Division***

* XII from SKD Academy, Lucknow 2012
* X from Seemant Inter College, Rupaidiha 2010

**Positions of Responsibility**

* Project lead for developing a high performance induction motor development.
* Assembly lead for the Electric driven pump (ETP) & induction motor for launch vehicles.
* Team Manager of the 25 member team that participated in event BAJA SAEINDIA 2016 held at Indore. Second best design all

over India among more than 400 teams.

# Personal profile

* Permanent Address :

S/O Rajesh Gupta New Market, Babaganj Bahraich, U.P., 271881

**Date of Birth** : 05-08-1994

**Sex** : Male

**Nationality** : Indian

**Marital Status** : Single

**Languages Known** : Hindi, English