Jay Ashwinkumar Ajudiya

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PROFESSIONAL SUMMARY

Mechanical Design Engineer with a first principles approach to solving complex engineering problems. I break down challenges to their core physics not just curing symptoms but addressing root causes. Skilled in FEA, CFD, and DOE to drive efficient, high-performance designs in EV and automotive systems.

CORE SKILLS

CAD Tools: CATIA V5, SolidWorks, ANSYS (Workbench, Mechanical, Discovery, Fluent), AutoCAD

Manufacturing Methods: 3D Printing, CNC, Additive Manufacturing, Composites Manufacturing, Fabrication

Design and Engineering: 3D Modeling, GD&T, Computational Fluid Dynamics (CFD), Design for Manufacturing (DFM), Design for Assembly (DFA), Computer aided Engineering (CAE), Finite Element Analysis (FEA), Prototyping, Topology Optimization, Generative Design

Programming: MATLAB, Minitab

CERTIFICATION

Certified SolidWorks Associate (Dassault system)

Electric Cars: Technology (edX)

Agile Innovation and Problem-Solving Skills (edX)

EDUCATION

California State University, Long Beach **Aug 2022 - May 2025**

*Master of Science in **Mechanical Engineering***

Concentration in Design and Manufacturing

***Coursework**: Additive Manufacturing, Composites Manufacturing, Design of Experiments, Controls of Dynamic System*

Uka Tarsadia University, Bardoli, Gujarat, India **Aug 2018 – May 2022**

*Bachelor of technology in **Automobile Engineering***

***Coursework**: Automotive Materials, Vehicle Dynamics, Automotive Transmission, Automobile Chassis Design, Automotive HVAC, Automotive Product Life Cycle Management, Automotive Aerodynamics, Automotive NVH*

PROFESSIONAL EXPERIENCE

Mechanical Design Engineer **Jan 2021 - May 2022**

Hero Electric | Motor Vehicle Manufacturing

- Engineered modular chassis designs using **CATIA V5 and** performed **Finite Element Analysis** in **Ansys Workbench**, validating structural robustness and optimizing performance.
- Executed **Topology Optimization** in **Ansys Mechanical** to create lightweight Electric Vehicle parts resulting in **20% more lightweight Electric Vehicle**.
- Applied first principles of thermodynamics to optimize battery cooling, resulting in 40% more heat dissipation.
- Implemented **GD&T** principles in the design and validation of Electric Vehicle components, ensuring precise manufacturing and assembly, resulting in less production errors.
- Utilized **CATIA V5 Sheet Metal** tools to design battery enclosures, footrest panels, side covers, and component mounting brackets.

CAD Designer **Aug 2019 - Dec 2020**

Esteem Auto | Automobile and Industrial Parts Manufacturer

- Developed and designed **400+** parametric 3D models of engine components such as cylinder liners, engine blocks, valve guides, and sleeves in **SolidWorks**, integrating automated **Bill of Materials (BOM)** to streamline manufacturing processes.
- Optimized complex assembly designs of induction-hardened liners and centrifugal castings through **Design for Manufacturing (DFM)** and **Design for Assembly (DFA)** principles, enhancing manufacturability and reducing assembly time by **15%**.

- Performed **Finite Element Analysis** in **Ansys** to evaluate component durability, and stress distribution led to structural integrity.
- Built precise **shop-floor drawings** and Assessed **tolerance stack-up analysis** to optimize component fit and functionality. This contributed to minimizing **post-manufacture errors by 12%,** improving overall assembly efficiency and product quality.

CAD Drafter Intern **May 2019 - Jul 2019**

Esteem Auto | Automobile and Industrial Parts Manufacturer

- Generated **2D and 3D CAD drawings** using **Geometric Dimensioning and Tolerancing (GD&T)** principles in **SolidWorks** for **prototype** engine blocks and cylinder sleeves, ensuring manufacturability through collaboration with fabrication teams.
- Produced precise **G-code** using **SolidWorks CAM** for mass Production of cylinder lines and casting components, ensuring optimized **toolpath** and machining process.
- Conducted **root cause analysis** to predict and resolve machining and assembly issues, boosting operational efficiency by **18%.**
- Systematized the **Product database** by creating a new organizational structure in **ENOVIA**, enabling the team to locate and retrieve design documentation in **10 seconds** or less.

Engineering Intern **Jan 2019 – May 2019**

Atul Auto | Three-wheel vehicle manufacturer

• Coordinated with integration team in assembling and aligning mechanical components for smooth vehicle performance and functionality.

• Took initiative in identifying process bottlenecks and suggested improvements, maximizing workflow agility by 10%.

• Conducted testing and validation of vehicle systems, improving reliability and reducing production errors by 15%.

RELEVANT PROJECT

Parametric Analysis of CPU Cooling Systems Using Heat Pipes **Jan 2024 - May 2024**

- Designed 3D models of the CPU, heat sinks, and heat pipe configurations in **CATIA V5**, ensuring accurate geometry and boundary interfaces for simulation.
- Executed detailed **CFD simulations** in **ANSYS Fluen**t to study airflow, temperature distribution, and heat transfer across multiple operating conditions.
- Performed parametric analysis by varying the number, orientation, and material of heat pipes, optimizing thermal conductivity, and surface contact.
- Achieved a **20 °C reductio**n in CPU temperature, significantly improving thermal performance and preventing thermal throttling.
- Enhanced overall heat dissipation efficiency, contributing to longer component lifespan and improved system reliability under heavy computational loads.

Topology Optimization of a Robotic Arm **Aug 2023 - Dec 2023**

- Created the detailed 3D CAD model of the robotic arm, base and joints in **CATIA V5**, incorporating manufacturable geometry for optimization.
- Applied **ANSYS** to conduct **topology optimization** and leveraged **Ansys Discovery** for **generative design**, targeting minimum material usage while maintaining structural integrity.
- Achieved a **70%** volume reduction and improved stiffness-to-weight ratio by identifying and removing non-load-bearing regions.
- Conducted static structural analysis under multiple load cases to evaluate stress concentration and deformation.
- Ensured the final design met all strength requirements with a **factor of safety ≥ 2**, validating readiness for lightweight robotic applications.

Hybrid Composite **Sep 2022 – Dec 2022**

- Analyzed 30+ research papers on hybrid composites identified up to **110%** tensile strength gain using graphene-jute reinforcement.
- Evaluated bio-composite structures; found **37× stiffness** increases with only **6% weight** gain in honeycomb-core sandwich panels.