HEMA VARMA MAHADEVU

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PROFESSIONAL SUMMARY

Mechanical Engineering graduate (M.S., Design & Manufacturing) with 2+ years of academic and industry-aligned CAD Design experience, FEA, and mechanical testing. Skilled in executing end-to-end mechanical product development, from design through experiments, documenting technical procedures, and supporting process development in academic and project-based environments. Proficient in SolidWorks, NX Unigraphics, Sheet Metal, Weldments, Revit, NX, GD&T, and FEA (ANSYS/Abaqus). Proven track record of executing assembly design, DFMA analysis, and component testing under manufacturing constraints. Adept at creating and inspecting tooling/assembly layouts, collaborating with cross-functional teams, and delivering accurate design documentation. Demonstrated ability to drive continuous improvement, develop SOPs, and enhance operational efficiency. Experienced in DFMEA/PFMEA, DFM/DFA techniques, and collaborating across disciplines. Currently on OPT and open to relocation.

EDUCATION

Florida Institute of Technology | Melbourne, Florida Aug 2023 - May 2025

Master of Science in Mechanical Engineering (Design & Manufacturing) GPA: 3.9 / 4.0

SASTRA Deemed to be University | Thanjavur, India Jul 2017 - May 2021

Bachelor of Science in Mechatronics GPA: 3.04 / 4.0

TECHNICAL SKILLS

- **Design, CAD Tools & Others:** SolidWorks, AutoCAD, CREO, NX Unigraphics, Autodesk Inventor, 3D CAD Modeling, Engineering Drawings, GD&T (ASME Y14.5), Revit (Basics), Bills of Material (BOM), Microsoft Office (MS Office)
- **Analysis & Simulation:** FEA (Finite Element Analysis), FMEA, ANSYS, Abaqus, DFMEA, Tolerance Analysis, Fatigue Analysis, Structural Calculations, PFMEA, MATLAB, LABVIEW
- **Manufacturing & Fabrication:** Additive Manufacturing (FDM 3D Printing, PLA), Hand Lay-Up Fabrication, DFAM (Design for Additive Manufacturing), DFA (Design for Assembly), Assembly Flow Optimization, CNC Programming, G-Code
- **Quality & Process Improvement:** Lean Six Sigma, Product Marking, 5S Methodology, Quality Control Charts, Problem Solving Techniques, Statistical Process Control (SPC), Root Cause & Corrective Action (RCCA)

- **Standards**: CMAA, ANSI/ASME, OSHA, MHI guidelines
- **Project Execution & Collaboration:** Cross-Functional Collaboration, Team Leadership, Technical Documentation, Time & Task Prioritization, Hands-on Prototyping

EXPERIENCE

Mechanical Engineer, Vivify Technocrats **May 2022 - August 2022**

- Directed a 4-member team in assembling an Automated Tray Retrieval System, achieving 100% alignment with design specifications and 100% on-time delivery by implementing proactive component tracking and validation protocols.
- Executed design validation and GD&T-based tolerance analysis to identify and resolve major component mismatches, reducing post-assembly rework by 40% via early supplier collaboration.
- Designed and documented mechanical assembly components in AutoCAD, streamlining component verification and cutting part verification delays by 30% to improve production readiness.
- Applied DFMA principles to enhance component accessibility and reduce assembly complexity, contributing to improved manufacturability and assembly efficiency.

PROJECT EXPERIENCE

Assembly Analysis & Design Improvements on a Hydraulic Car Jack **August 2024 - December 2024**

- Evaluated hydraulic jack assembly using Boothroyd-Dewhurst DFA, identifying 6 inefficiencies in part handling and insertion that increased assembly time by 20%.
- Redesigned assembly flow, reducing component count by 30% and cutting assembly time by 25%, resulting in improved manufacturability and 15% lower labor cost.
- Created detailed exploded views, CAD redesigns in SolidWorks, and tabulated time-cost analyses, reinforcing design-for-manufacturing awareness and cost-conscious engineering practices.

Crack Propagation of Carbon Fiber Epoxy Reinforced Composites **January 2024 - May 2024**

- Simulated crack initiation and propagation in 4 CFRP layups using Abaqus XFEM under quasi-static (10 mm/min) and dynamic (1 m/s) loading to assess ply orientation impact.
- Modeled 5-layer composites with diverse fiber orientations to investigate failure behavior; applied linear meshing and boundary conditions for high-accuracy stress analysis.
- Generated comparative graphs and stress-strain plots to interpret results, supporting improved design decisions for aerospace-grade structural composites.

The Mini Air Circulator - A 3D Printed Handheld Fan **August 2023 - December 2023**

- Engineered a multi-functional compact fan integrating features like a scale, bottle opener, and ergonomic grip, designed in SolidWorks under DFAM (Design for Additive Manufacturing) principles.
- Conducted FEA simulations in ANSYS to assess structural integrity, stress distribution, and safety under operational loads.
- Fabricated and assembled the prototype using PLA filament via FDM 3D printing, optimizing material usage and print efficiency.

Quality Control Evaluation of a 3D Printed toy **August 2023 - December 2023**

- Designed a 6-component educational toy using SolidWorks, incorporating bow-and-arrow mechanics on a modular base to promote wildlife ethics; fabricated and assembled the prototype using PLA filament via FDM 3D printing.
- Developed a complete quality control plan including UCL/LCL control charts for dimension verification, safety compliance (non-toxic, non-choking parts), and user testing.
- Quality control evaluation using Control Charts for values & attributes revealed that the toy needs some future improvements for resolving some issues.