

Project Portfolio

Prathmesh Vipra

+1 (312) 868-8695

prathmeshvipra53@gmail.com

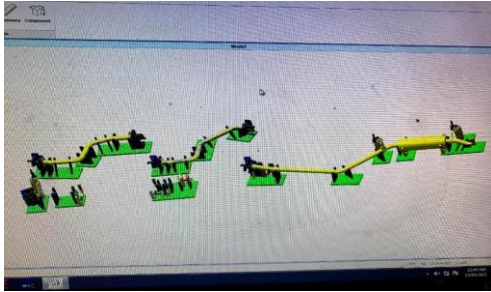
<https://www.linkedin.com/in/prathmesh-vipra>

Summary:

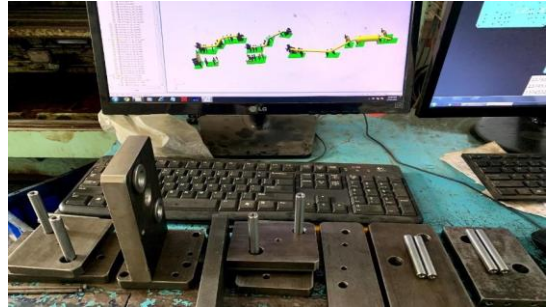
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Project 1: Fixtures Design and Manufacturing

3-D CAD Model



Assembly Process



Objective/Aim

- Major project completed during internship at BAPL, Pune, India.
- Design, manufacturing, assembly and quality control of Piping Welding Fixture Assembly.
- Understanding special customer (Faurecia Company) needs and modifying design accordingly.

Technical Details

- Designed and drafted parts for piping fixture assembly using Creo and SolidWorks.
- Fixture used for welding of exhaust piping assembly.
- Coordinated part manufacturing and managed manufacturing process (Milling, Drilling, VMC, CNC) of product parts.
- Performed 3-D dimension error minimization using Coordinate Measuring Machine (Autodesk Inspect Software).
- Conducted quality control checks and made quality reports for product parts.

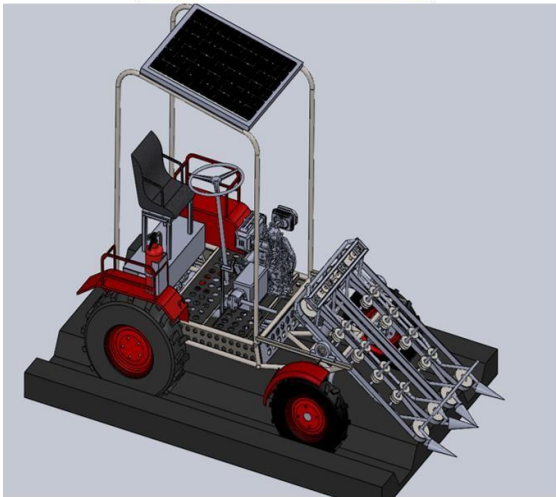


Outcomes/Result

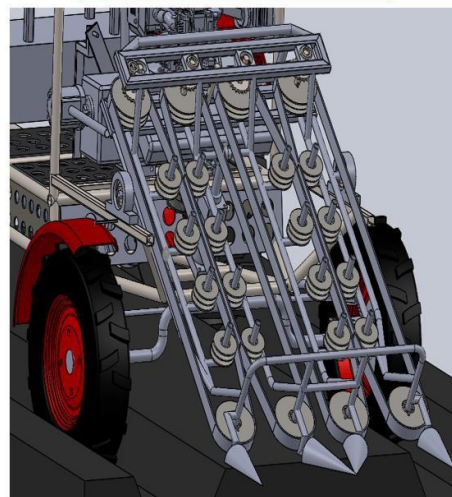
- Successfully designed and drafted parts for the piping welding fixture assembly.
- Created a priority list for part manufacturing resulting in faster assembly process.
- Solved doubts for machine operators regarding part drawings and machine operations.
- Solved part assembly errors and oversaw assembly operations while providing solutions for dimension and fit issues.
- Minimized errors in 3-D dimensions to under 0.3mm using Coordinate Measuring Machine.
- Completed quality reports for all product parts.
- Successfully delivered finished product to customer under stipulated time.

Project 2: Onion Harvester Design Competition (SAE TIFAN)

3D Image of Vehicle Assembly



3D Image Of Mechanism



Objective/Aim

- TIFAN stands Technological Innovation Forum for Agricultural Nurturing – annual national level competition organized by Society of Automotive Engineers, India.
- The aim of the competition was to design and field test onion harvester machine while competing with teams from various universities throughout the nation.

Technical Details

- Fabricated a self-propelled onion harvester machine with an 8HP diesel engine.
- Designed a pulley driven belt system for harvesting the onions which runs on a hydraulic pump running from the PTO shaft of the gearbox.
- Used a hydraulic actuation system to adjust the height of the harvesting mechanism.



Outcomes/Result

- Successfully demonstrated actual working of the harvester in the TIFAN competition and presented the design.
- Promoted from Chassis Design Head to Vice Captain of the team.
- Lead college team of 20 members in the annual national competition twice.

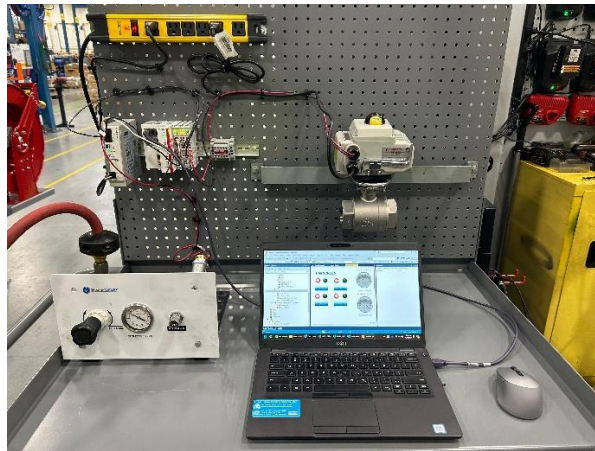
- Designing a **Core-XY 3D Printer** using SolidWorks with modularity and future upgradeability.
- Enhancing print quality and speed using a **high-rigidity frame and input shaping**.
- Enabling **multi-material printing** with a swappable toolhead system.
- Optimizing the **Bill of Materials (BOM), Cost Savings and manufacturability** using DFM techniques.

- Implemented modular architecture, allowing easy upgrades and seamless component swaps without major redesigns.
- Engineered a **high-rigidity frame** to withstand high acceleration forces, leveraging **input shaping** for vibration compensation.
- Used a hydraulic actuation system to adjust the height of the harvesting mechanism.

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- Achieved a future-proof 3D printer design with easy component upgrades.
- Improved printing speed and accuracy by minimizing vibrations and enhancing motion stability.
- Enabled multi-material capability, expanding printing applications and usability.
- Optimized manufacturing efficiency by refining the BOM and using DFM principles.

Project 4: PLC based Automated Product Testing

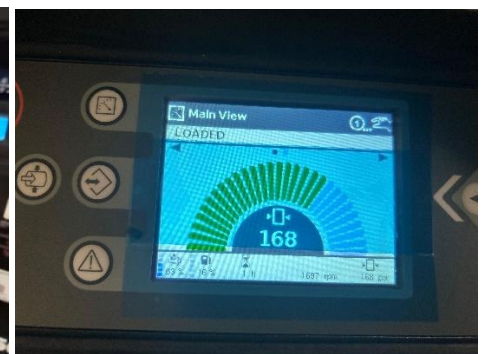
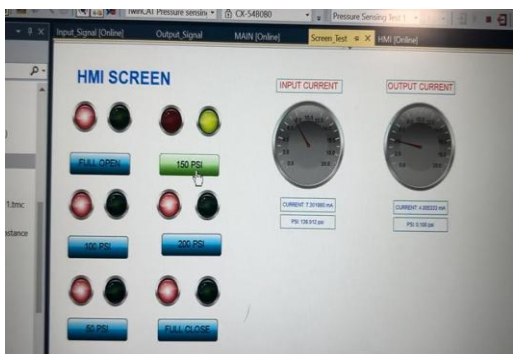


Objective/Aim

- Automated compressor product testing with data monitoring and collection.
- Implementing a fluid dispensing system with automated tracking to optimize resource utilization.
- Integrating PLC, HMI, SCADA, and MES/ERP systems for real-time data analysis and reporting.

Technical Details

- Designed a **PLC-automated station** for compressor product testing, collecting and monitoring data for **30+ products** using **SCADA**.
- Developed an **automated fluid dispensing station** that tracks daily usage and optimizes resource allocation, leading to an estimated **\$100K annual savings**.
- Integrated **HMI and SCADA** for real-time data visualization, enabling operators to monitor key parameters efficiently.
- Configured **MES and ERP data connectivity**, ensuring seamless data flow across production and business systems.
- Automated data logging and analysis using **Excel graphs**, enhancing reporting accuracy and trend analysis.



Outcomes/Result

- Achieved **fully automated and monitored product testing** with enhanced process visibility.
- Enabled **real-time tracking of fluid dispensing**, reducing material waste and improving cost efficiency.
- Improved **data-driven decision-making** by providing structured reports and graphical insights for process optimization.

Mini Project: Engine Heat Shield Drill Jig

- Modelled the drill jig in Creo parametric software as part of internship at BAPL Pvt. Ltd.



- Assembled the drill jig using Creo View Express and dowels and bolts.
- Tested the part fitting in the jig and making few machining operations to ensure constraint in motion.

Mini Project: Hose Crimping Fixture

- Took CMM readings of hose crimping fixture using Arm type Coordinate Measuring Machine.
- Analysed the readings and reduced the deviations of the actual prototype from the model using shims and machining operations.
- Completed the project during the training phase of internship at BAPL Pvt. Ltd.

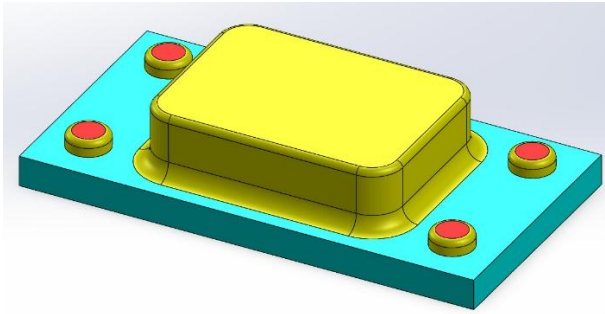


Mini Project: Hose Crimping Fixture

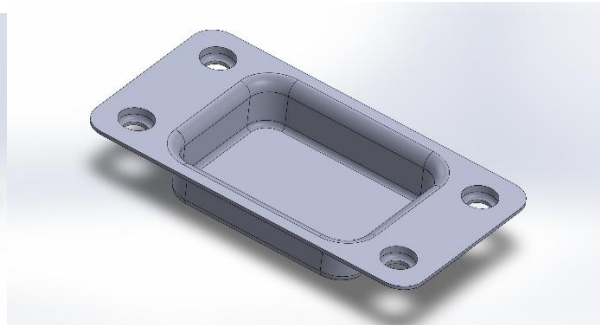
- Interpreted the circuit diagram and assembled the entire pneumatic circuit.
- Used solenoid actuated DCVs which were used to actuate cylinders for clamping of the part which needed to be tested for leakage.
- Completed the project during the training phase of internship at BAPL Pvt. Ltd.



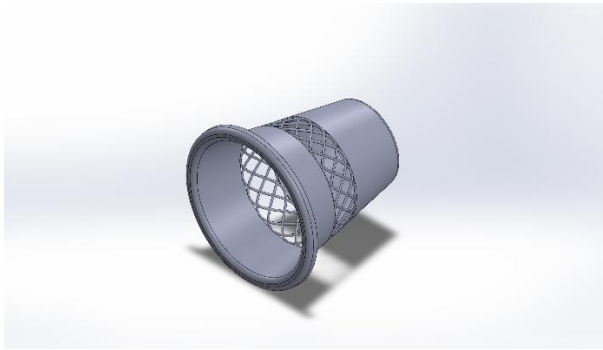
Course Projects and Miscellaneous



Sheet Metal Forming Mold



Design Sheet Metal Final Part



Dustbin



Eyebolt



Spanner



Geartrain